John Cranford,
M. D.

Commence with Lect. 95.

Lectures on surgery and comparative anatomy.

+

[Alexander Monro 52.?
Taken perhaps by John Hamilton Smith 1758 - Perhaps Vol. 7.
See other entries in N.-1]

Crawford

4489

1873
SCHOOL OF MEDICINE

Ewa
4489

Lecture 95th

Surgery

I have shown that all the bad Symptoms in Dentition arise from the Laceration and Erosion of the Nerves of the Gum covering the surface of the Teeth and hence I infered the propriety of dividing the Gum as soon as there is an evident Swelling of it. The Division is to be made with a sharp Instrumt and we are not to follow a very common practice of using the nail to tear the Gum, or of tearing it with a crooked sixpence, nor are we to use the practice of giving Children bits of Coral, & other hard Substances under the name of Gumsticks, we have here followed the Instinct of Nature too far. Children apply their fingers to their mouths, but we are not on that account to

to introduce Substances which bruise ye Nerves, & often bring on or add to the Symptoms. We are to make a ~~Circular~~ * Incision, as a single Incision does not allow sufficient room for ye Tooth to get thro. now we may make one Incision cross the Gum with a common knife, guided by the finger, but it is difficult to make it Transversely, besides with ye knife used for Scarifying the Gums we are in danger of hurting the Tongue or Cheek, so I have caused to be made two Fleams or Lancets, which I introduce concealed within ye mouth, then press down the Lancet, & make the Incision first in one direction, then taking the other I make the cross Incision without any danger of cutting more than I intended.

Next I have shown the propriety of drawing the Teeth of the first set as soon as they begin to ~~separate~~ decay. Very little force is sufficient & you scarcely need more than a pair of Forceps.

Next I have shown that a Stony matter sometimes grows upon the Teeth in very great quantity

quantity, wch has been called Tartar from the Idea that it is produced from the acid parts of the food remaining in the mouth, as Tartar is produced from casks of Wine. But it is evident from comparing it with the Concretions in the ducts of the Salivary Glands, that it is solely from the Saliva; so it is in greatest quantities at the roots of the Incisores of the Lower Jaw where the Saliva falls down by its weight. This Substance then contains nothing acid or Corrosive, acting as an acid upon the Earth of the Teeth, yet it is very hurtful to them, because the pores of it lodge the Saliva & other humours for a length of time, which therefore putrify in it, & it mechanically pushes away the Gums from the Collar of the Teeth where they have a close adhesion, and where the Vessels enter the osseous part of the Teeth. we are therefore to take pains in separating the Tartar, never allowing it to grow to any considerable bulk, & that by scraping it off with Steel Instruments, for all the powdery substances are unsafe,

especially

especially if there be any acid among them, as Cream of Tartar, which corrodes the Teeth, so we employ pieces of Iron shaped to scrape the Teeth, or by the points to enter between them, & we ought to make it a Rule, in time of the Operation to apply a soft substance, as y^e point of the finger to the Teeth, to prevent the uneasy sensation from the Tumor, & we ought to scrape them till they are smooth, otherwise it breeds much more quickly. All the necessary Instruments are made to screw into the same handle.

We next proceed to the Disorders affecting the Sockets, the Gums, or the body of the Teeth. Besides the Accidents to w^ch from their office & situation they are exposed, & the bad effects w^ch y^e air & food, loaded w^h various matters must have upon them, as they agree in Structure with the other organs, have a Circulation thro' a great part at least of them, thro' the whole Gum, the Socket, the membrane upon their surface, & the Pulp, as also Lymphalid

Lymphatic vessels, as the Lymphatic Glands swell when the Teeth are Carious, nay sometimes after swelling they break, & unless the Carious Tooth be removed it is difficult to heal up the Ulcer. Then we know not merely from the sensibility but from the size of the Trunk of the Nerve diminishing as it passes thro the Bone, & the threads entering, that they are provided largely with Nerves, nay perhaps we cannot show a Nerve of the same size distributed to any other part in equal proportion. So from all these circumstances it will appear that the Teeth are subject to the same general Disorders as the rest of the Body, so to Inflam^n & all its Consequences, nay we may go farther & observe, that as some Organs of the Body are more the subject of certain Diseases than others, so certain Diseases at first seeming to affect the whole Body, are afterwards more particularly determined to the Teeth, thus they suffer remarkably in the Rickets, in the Scrophula, frequently

frequently in the Scurvy, one of y^e^ Pathognomic Symptoms of which is a rottenness of y^e^ Gums & of y^e^ Sockets of the Teeth. The Lues Venerea, and its remedy Mercury, especially the remedy, affect the Gums, we distinguish the presence of it very readily by the appearance of y^e^ Gums, & as we observe in certain Conditions, a some what generally called a humour, as in the Gout, falling on the Teeth, so what is called a Rheumatic humour, no matter to the exact nature, or first Cause of it, but y^e^ Complaint is ready to fix upon the Teeth, so when some persons catch Cold, instead of the nose being affected with Catarrh, or its falling upon the Lungs a pain is observed in the Teeth. Now where an Inflammation occurs in y^e^ Pulp within a Tooth, as persons will not be prevailed upon, tho' they suffer a good deal of pain, to treat it by the Antiphlogestic Regimen, as they would in an Inflam^n^ in a part necessary to Life, there is more danger of the Inflam^n^ terminating in Sup-

puration

Suppuration or Gangrene, whereby y. whole Pulp & nerves within the Cavity of the Tooth are consumed, & for the most part the Tooth ach begins in the innermost part, there is an aching in the Tooth before the Caries is observed, but it sometimes happens that we observe upon the Tooth black spots, long before the person suffers any pain, so it would seem that in some cases the Caries went from the Surface inwards, only producing pain when it reached y. Pulpy substance. From this circumstance a rule has been laid down by Surgeons, that when such spots appear, they should be immediately taken off with the File, applying the finger to the Tooth when we use it, & we ought to have a number of files of different shapes. Now this may sometimes be proper, as it is merely possible, that a spot beginning on y. surface of the Tooth may affect the neighbourhood, and so spread, yet this seems a little doubtful, & instead of laying this down as a gen.l Rule, it would be better to follow the directly contrary,

not

not to do the Operation merely in consequence of a spot of a dark Colour, for we have many Instances, where the whole surface was black, & continued so for 12 or 15 years, without the Tooth mouldering away altogether, & tho the Enamell of the Tooth is not primarily formed to defend the Osseous matter from the air, & therefore from Caries, as the Osseous Substance, after the separation of the Enamell continues to live, yet Heat, Cold &c now affect the Tooth more violently, & the air no doubt has a bad effect upon all Bones, tho here it has less on account of the hardness, & the supply being chiefly from within. Sowe are not to suffer a Dentist to file down the Teeth in order to make them more regular and beautiful, as in a few years such Teeth are consumed.

Suppose next a Tooth has become carious, that it gives pain, that the Caries has reached the Cavity, in what manner are we to treat it? If the hole leading into the Cavity be small, and

and but little of the Tooth is consumed, we ought to save the Tooth, & to stuff the Cavity w. Lead or Tin beat very thin. some use Gold, but the Tin is to the full as good, by it this we exclude the air, a very principal Cause of the pain, & hinder substances whether solid or fluid to get in to irritate the pulep, & Teeth treated in that manner have been found to last for many years.

Suppose next that a Tooth is much consumed, if we have our choice we would extract it, but if the Patient will not submit, we endeavour to palliate the Symptoms in various ways. We lessen the general Sensibility by giving Opium, Hyosciamus or Camphor, which some noted Dentists consider as preferable to Opium. Next we attempt to remove the pain by Shocks given in different ways, an Electrical Shock has frequently done this. we make it pass thro the affected Tooth, & if pain is removed, on what principle I cannot tell, but perhaps we may explain it in some

degree

degree from the next kind of shock, & that is the burning the Ear with a red hot Iron passed thro' a Canula, & the inner Bar is generally chosen, as is one of the most (2. sensible) parts. now the first time it very often succeeds, but after wards it fails, when the Patient discovers that it is quite a trifling operation. it seems therefore to act by the sudden surprise of the mind, so in doing the operation we should endeavour to frighten the Patient as much as possible by showing the Iron, instead of concealing it. — Next we lessen the Sensibility of the Tooth itself, & certainly opium applied imy to the Tooth has a greater effect than a much greater quantity taken into the Stomach, so the Opium does not act to such a great depth as many imagine when applied to the bare Nerve it will act in a topical way, & lessen the powers of the Nerve it touches, & these powers are again recovered, as when we apply it to the muscles of y. Extremeties, which again recover their power, & this

may

may be applied in Practice to the Spasms of Mus-
cles, but it would require many Cases to draw
any fixed Conclusion. Next we employ Subst.s
that affect the Nerves like Opium, & perhaps
acts further by hardening their Substance, as
~~Opium~~ ardent Spirits. Experience shows
that these very readily allay the Pain & the
Essential oils act somewhat in the same
manner. But if these fail, & still the Pat.
will not allow the Tooth to be pulled, we
destroy the Nerve by burning it with a hot
Iron, or a bit of Caustic put into the hollow,
stuffing the Tooth with Lint that it may not
spread, & the pain attending this Operation
is not so excessive as one might conceive
at first sight. —

Suppose next all these means to fail, or
that we have got a Patient that will not sub-
mit to the Extraction of the Tooth, we may
first raise it a little, then put it down
again, what some of the French have
called the Luxation of the Tooth, & which
is

is frequently practised in France, we thereby tear the Nerve, and putting it back again, it may fix itself afterward to the Socket, either by continued Vessels, or like the growth of a Vegetable, & really live as before.

To do this till of late years we had no tollerable Instrument, nor have the French to this day, tho they bestow more pains than we do on the manmagement of the Teeth. Certain Forceps were imployd, w^ch acted with the force of the hand only. after that an Instrument was a good deal in use called a Pelican, which is applied over y^e Tooth, and has a rest against the Socket, & with this you draw it over, but there are two objections to the Instrument, one is y^e the Traction is oblique against the next Tooth, & the other is that it draws the Tooth too much over without raising, some have tried to remove the first objection by bending the claw, but tho you bend it 20 ways it still draws in a straight line between its

its root and the top, so this Instrument is to be
intirely laid aside. The first tollerable Instr.
we had, and which now are in universal
practice, are what you will find first describ-
:d by my Father in the Med. Ess. Ays. The one
of them is intended for the fore Teeth, it has
a prodigious power of Lever, & whilst we
turn the Tooth over with out any particular
action of the hand, we raise it a little, & we
may raise it farther by the strength of the
hand, & this Instrument will also apply
to the Caninis, & the two small Mollares.
The other Instrument the Turn key, is for
the large Mollares, by turning the handle
of it you draw the Tooth over, & at the same
time you raise it from its Socket more
than by the former Instrument. Improve-
ments have been attempted upon this Instr.
Some have thought that the Socket of the
Tooth was too much grasped, so have made
the rest at a distance, but by this altera-
tion whilst this Tooth is drawn inwards,

another

another may be pushed outwards, so we lay the Improvement aside altogether. If there was any thing real in this Objection, another Gentleman has made an Instrument with a good deal of Ingenuity, where we act with two hands, & prevent the Rod from being turned too much upon the Socket, but here both hands are employed, & the objection is really not so much to be regarded as might be supposed, for if pressure upon the Socket does very little hurt. Or should you be of a different opinion, you may remove the objection by making the rest broader & lower down upon y. Jaw. another Gentleman has altered the situation of this Instrument in y. mouth, that instead of putting the stalk on the outside, & the Claw upon the inside, by a bend in the handle, we can put it in the inner side, & fix the Claw upon the outer. Now this brings us to a Question, which of these 2 situations is the best?

Jn

In the two backmost Molares, & especially in y. backmost, there is no choice, for as y. backmost runs within the Condyles of the Jaw, you can not fix the Instrument upon the outer side, so this is an Improvement with respect to these. With regard to all the others Mr Hunter alledges that the Instrument should be fixed on the outer side, but I apprehend he has not fully attended to the turn which the Teith makes, & the effect this has upon the Socket. His Idea is this, that the common Instruments draw the Teith pretty straight over, bending or breaking the Socket upon that side towards which they are drawn. Now generally it is the other side which suffers, so the first part put in motion is the very apex of the root, so his practice should be reversed according to his own Rules, & we should pull on the inner side. & the third Molares is not placed perpendicular, but slants inwards, so that it will break more readily if they are pulled outwards. so the first

large

large Molares is to be drawn in the same manner as the two last, with regard to the rest I will not dispute the point, especially at the fore side where we would humour the Gent outwards. The other Instrument has scarcely been improved, the claw has been adapted to Teeth of different sizes, by means of a Screw, but the same purpose is answered by having two or three of different sizes, when we have a firmer Instrument with a plain hinge. The Timber handle to the Turn key is better than the Iron one, as sometimes more force is required than you would expect. The two Instruments have been put into the same piece, & by means of a Catch we can turn the claw, either to the fore part, or to the other side.

Now these Instruments are still in some respect defective, for by them a Tooth is drawn sideways, & not lifted up from its Socket directly, so Dr Higgens has contrived

contrived an Instrument to remedy this, we grasp the Tooth with a pair of Forceps, y. Claws of which move upon a Nail, by which they hang perpendicular, in order to make the Traction as streight as possible. then we introduce behind the Forceps a piece of Iron wch is flat below, & covered with Leather, & apply it to the Neighbouring Tooth, & thus we lift the Tooth more directly than could be done by the other Instruments. I have tried another way, a piece of Iron is fitted for fixing on the Tooth at the Collar, then a bit of Slit Iron is laid down upon the neighbouring Teeth to make a resistance, then a pair of Forceps is introduced, by opening of which we lift the Tooth streight from the Socket. I shew you another Instrument, which a Gentleman who attended here last Winter, was so obliging as give me, it consists of a pair of Forceps for grasping the Tooth, & has a rest upon which we turn it. Now I find that with Dr Higgen's Instrument, & still more readily with this,

I raise the fore Teeth very accurately, & much better than with the Common Instruments, but the backmost & very strong Molares are in danger of being cut when we pull by the sharp Teeth of such Instruments, & there is also a want of room, tho' they may be adapted with advantage to particular Cases. I shou you a nother Instrument brought from Paris, a piece of Iron moves in a Circle, which fixes the Tooth fully, & at the same time draws it up, while two pieces at the side make the resistance upon the next Teeth.

After we have extracted the body of the Tooth, the roots frequently breath & remain. Now these may be taken out by a common pair of Forceps when Loose, or if these have not strength sufficient there is no better Instr. than that of Mr. Higgan's Forceps, or we use the Lever, which is bent a little, & thrust down at the side of the root, & when there are two points, it is better to separate them and draw them singly. With respect to

to the posture of the Patient. Some in all cases place them between their knees, others on a chair, the general rule is to place him upon a low seat if you are to operate upon the under Jaw but if upon the upper he may be laid across a Bed with his head over it, or he may sit on the floor on a cushion, with his head laid back between the Surgeons knees. The Gum must be separated from the Teeth, that the Instrument may be fixed upon the Collar, and it might also be of use to cut the Socket, which is frequently broke, & tho this is of no consequence unless it is to a great extent, yet it would lessen the danger of the Tooths breaking, or of a Fracture of the Jaw, & less force would be necessary, it is done with a sharp Instrument, & a slight stroke of a Hammer. I have said if the Tooth is tollerably sound, it should be put back, but if it is much consumed & this cannot be done, as the opposite one is in danger of being pushed from the Jaw, it may be worth while to fix in an artifi-

cial

artificial Tooth, but on account of the Injury this does to the Socket, this is hardly advisable, unless it be a fore Tooth, & the Speech be hurd by the want of it, & we ought to tie it in with Thread & not with Wire, which has a bad effect on the Tooth. If the whole set fall out, the Dentist adapts Sets to the Jaws, fixing them by Springs, but the adjusting of these rather belong to the Mechanic than the Surgeon, as it is not necessary that he should be acquainted with the manner of forming them, any more than that he should know how to make the several Instruments now shown.

The Diseases of the Teeth from their Vicinity frequently affect the Antrum Maxillare, which besides is exposed to Diseases which originate in it. Often the Inflammation of the Antrum ends in Suppuration, & where that is the Case we distinguish the Disease from Toothach, by attending to the Cause of the pain, its Constancy, & if the opening from the Antrum into the Nose is not shut

we

we can bring the matter to fall into the Cavity of the Nose. and the Patient is able to distinguish a bad smell in one Nostril.

Next we oftend find the matter has made its way by the roots of the Molares, & in some Cases it has broke out on the Cheek, or it may make its way on the inner side of the Tooth, in the roof of the Mouth. In some Cases the matter enlarges the Cavity of the Antrum, or the whole substance of the Bone comes to be Diseased, grows soft & swells out. Now as it is a rule to give the discharge from bottom of Tumours, we ought to do that here, so if the Molares are Carious, we draw first the Carious Tooth, but if the Teeth are sound, and we are aware of a Collection, we may make an opening on the outer side of them, & we are never to attempt it at the inner side, on account of the Nerve & Artery which go down thro' the Palato-Maxillary Canal. If several of the Teeth are Carious & we have it in our choice, we should prefer the backmost Molares but one, which

which is at the very bottom of the Cavity, and the palate over the root is thin, but we may pull any of the large Molares, & even the first of the Small, but we are not to go farther forwards, unless where the Antrum has an uncommon size. So Highmor speaks of matter having got out thro the Socket of the Dens Caninus, but I never found it come so far forwards, for making the perforation any common Instrument will do perfectly well, as a Shoe maker's awl, or if the Tooth is out the Spungy Socket will admit a Trocar, when we have the advantage of the Canula, which is of use afterwards for making Injections, which assist in the Cure by washing out the Purulent matter, an Infusion of the Cortex is very proper for this purpose, & as it is troublesome to use the Syringe every day, I have caused to be made a small Silver pipe with a plug of wood, which need only to be removed once in three days, and the Patient taking some of the Infusion into his

his mouth, and taking out the plug, can wash it himself, and he continues this practice for 10 days or a fortnight till a considerable change is made upon the Disease.

Lecture 96th.

We now proceed to the other operations of Surgery, and in this part of the course I shall make it a Rule, first to explain the Changes produced by Disease, which require an operation, with the manner of distinguishing these, then I shall show you the Instruments, and the Methods proposed by the most eminent Writers for the Cure, then from considering the Structure of the part, & the alteration it has undergone, I shall endeavour to determine the most fit method for operating, & lastly I shall shew you the operation on the Subject.

I have sometimes thought of reducing Operations into Classes, Orders and

and Genera, as is done with the several Diseases, but I find that, besides many difficulties that occur here, we would after all reap very little advantage, they are so very different from each other, and it is sufficient that we reduce them under general heads, that bring under the same view the similar operations, tho done on different parts of the Body, & instead of following Heister &c in describing first all the operations necessary to be done upon the head, then those on the Thorax &c which is attended with endless repetitions, or certain Operations must be described in the most imperfect manner, I shall lay down general Rules for the several Operations, as for Amputation, & after these are understood, I shall point out the Circumstances that are particular, arising from the shape of the part, or distribution of its Vessels & Nerves. Now as this is all that we attempt, it is not materiall whether we

we begin, whether we go a Capite ad Calcem, or
reverse that order. what I find to be the most
convenient is first after describing some few
things necessary in almost every operation,
to explain the operations that are done up-
on the abdomen, including all others that
resemble these, then to proceed to those done
upon the Thorax, and to finish with those
done upon the Extremeties. I choose this order
that we may get rid of the putrescent parts
of the Subject as soon as possible, for other-
wise the advantages are perfectly equal.
and as in most Operations the Surgeon either
finds a Wound, or is obliged to make one,
I shall before entering on any particular
part show the method of treating wounded
parts by

Sutures — if Dressings or Compresses
with Bandages & Plaisters are not suf-
ficient for the purpose, Surgeons have
recourse to the sewing of the parts. Thus
suppose that a Cord of Vessels, such as the

Spermatic

Spermatic is laid in View, & that the whole or any of the parts needs to be tied up, we take hold of the Cord & in one hand, the needle & Thread with the other, & comprehending the whole, or a part, as the occasion may require, we make the most simple Ligature, & if it is to remain we form a common knot, but if it is to serve the purpose of a Tourniquet only for compressing the Vessels suppose, then we make a running knot, which we can undo at pleasure.

Next, suppose the mouth of a Vessel presents, as after a Leg or Arm is cut off, & we suppose that the Umbilicus represents the mouth of the Vessel, how are we to stem the Blood? Perhaps the method of which would most readily occur to an Ingenious person is the best, i. e. to take hold of it with a pair of Forceps, or Common Hook, by which we can pull it out when we tie a thread about it in the most common manner. But instead of this

Method

Method the most common practice is to surround the Mouth of the blooding vessels. a thread without drawing it out, & to take in some of the Flesh or Cellular substance, and many Cases may occur where we are from necessity obliged to operate in this manner; thus a vessel may pour out blood, where we see the place nearly, but not perfectly, or the Extremity of the Vessel may be in a putrid state, or sunk in the flesh. Out of Choice then, or from necessity, Surgeons employ the Crooked Needle, & the thread ought to be about the size of the Needle, & the two ends brought to be equal. We begin on one side, and as the Needle is semicircular, we can describe the Semicircle with it, and entering it a second time nearly where we brought it out, we complete the Circle, and there is no reason why with Sharp we should only at once describe ⅓ of the Circle, surely the nearer to the complete Circle the better, then we tie the Thread, & the force

here

here necessary is much less than Surgeons generally suppose. They take it to be so great that they include with the artery a good deal of Flesh. now suppose the Coats of the artery to be alone drawn out I can make a ligature so tight, that I cannot easily burst open the artery with the Syringe, the rest of the coat will as readily give way, if tying an artery we make the most common knot, and it is scarcely necessary to add a second, to prevent the first from slipping, but it may be done if you chuse it, but if you are to tie a ligature round a firm Elastic substance, in order to stop the circulation in it, you would employ what the Surgeons call their knot, i. e. you would pass the thread twice, this does not apply so readily round the artery as a single one, but after it is drawn it resists more.

Next suppose a Membranous part, as the Alimentary Canal is cut, & we are to join the sides of it, we would not use the

the round or Crooked Needle, but rather a common Sewing Needle, & we would join the parts in the way two bits of Cloth are joined together, and bring the lips of the Wound close, pass thro' both, & repeat these turns in the most simple way, but if you suspect or suppose with Le Dran, that the Intestine is so thin, that the Cicatrice will not sufficiently resist the Expansion of the air within the Gut, nor confine the food, we may attempt to heal the wound in his manner, which is that you pass ¼ Inch Distant, a Number of Threads with the straight Needle, then take hold of them on both sides, and draw them together and twist them, by which the Intestine is shortened, and therefore the Cicatrix made thicker, but in the wounds of the Intestine I believe the most common method is the best, for while the thickness is increased, the Cavity of the Intestine is straitened, whereby the Foeces are in danger of being accumulated, and

and of bursting the Intestine, but we would not employ in such a case, what has been commonly done, the Method recommended by Celsus for suturing Wounds in general.

Next suppose that a part of a moderate thickness is wounded, as a Lip, we join the parts by a Pin, or round Needle without Thread, then draw the Lips together by passing a thread over the pin, repeating the turns at pleasure, & we employ in a long wound more than one Needle, or as many as the length may render necessary.

Next suppose a very deep wound, that parts are wounded of great thickness, & with a retraction, partly owing to the Inflammation which succeeds the Wound, partly to a Muscle being divided transversely thus suppose a wound in the fore part of the Thigh, and I shall make it slanting, which is the most difficult to manage. Now you must always have in View that we first try what Bandages & proper Plaisters will do, attending

ing

attending at the same time to the posture, if the Flexors are wounded bending the part, if the Extensors extending it, but I must suppose that the Bandage is not sufficient, & that we need a Stitch to retain the parts, how is that to be formed? Sharp, LeDran &c direct to bring with your hands the lips of the wound contiguous, then to enter the Crooked Needles, followed with threads at an Inch distance from each other, so if the Wound is 4 Inches in length, we are to make 3 Stitches: next we are to enter them at a sufficient distance from y. sides of the wound. LeDran proposes that y. distance should be nearly equal to the depth of the Wound. Sharp reduces the distance to measure, but it must vary according to the depth, as the retraction will bear a proportion to it, but in a deep wound we are to goe by neither of them, for how can we make a Needle enter at a distance equal to the depth of the wound, & bring it out at the opposite side, unless the Needle be very long? and how

how do we know that the needle has passed at the very bottom of the Wound? If it passes deeper it must wound the parts underneath; if more superficial, a part of the Lips will retract, & a bag of Matter form. So the best measure is this, if a part is not very thick, as the skin of the Head, & a large portion is cut, the sticking of it is of advantage, at proper distances to keep the skin in its place, while the rest is secured by Plaister & Bandage, & we would follow the Method of either of these Authors, at once passing the Needle thro' both sides of the wounded Tegumentes, but in a deep wound the best rule is to lay the Lips of the Wound together, then to consider y. depth, the number of Stitches & the distance necessary from the sides of the Wound, & if it slants it must come out farther where the flap is formed, & the Surgeon takes a pen & Ink & marks the place where they are to come out. Then opening the Wound & employing two Needles, one at each end of the Thread

Thread, he enters one at the bottom & brings it out upon the one side, then he does the same thing with the other, entering it from the bottom & bringing it out from the other side, then putting the member into the posture in which it is to remain, assistants push the lips together, & he ties the knot, throwing it upon the sound skin, not upon the lips of the wound, & after one, he makes a second, with the view of not unlooseing it again, for the matter which comes out, entangles the threads so much, that if they are to be changed the ligature must be cut. If however there is a probability that in a short time some alteration will be necessary, you may form it so as you can loose it again, as to the practice of putting bits of linen rolled together, between the ~~lips of the wound~~ first and second knots, & adding a third to them, it is a mere incumbrance, for the pain is from the retraction of the lips of the wound, & not from the knot laid on the sound skin.

(Now

Now the only other remaining suture is where a wound penetrates into the large cavities, as into the abdomen, in that case it has been thought that a more equal support to the sides of the wound was necessary to prevent Hernia from happening, the lips of the wound being drawn in and openings left, so a contrivance has been proposed to make the lips of the wound perfectly equal, Viz. you pass the Threads, & then you draw the lips together by Pigs or Rollers of Plaister with a bit of wood in the Middle which is called the Quill or Peg Suture. The Thread is doubled to let in the Peg at one side, then taking hold of the other two ends, you bring it down, and dividing the Threads & putting in the other Peg, the assistant presses the lips together, whilst the Surgeon ties the Threads, making the knot to fall upon the Peg, & here we make a running knot, because the Peg being between the wound & knot, we can

loosen

loosen & change it. Now I am not altogether sure if this be preferable to the interrupted suture providing only that you employ more threads than is commonly done, as it is very material that the wound be closed accurately, so as to exclude the air.

Lithotomy

I shall next attempt to explain the operations which are practised on the organs of Generation in both Sexes, beginning with the very principal operation for the Stone in the Bladder, for I need add nothing to the objections I made to Nephrotomy, or the cutting a Stone from the cavity of the Kidney. But I shall hard round again the different kinds of Calculi, with regard to which there are a number of things which require your attention. They differ very much from each other in Colour, in Consistence, some vastly harder than others. Next the shape

varies

varies greatly, but upon the whole where y^e^ Stones are within the cavity of the Bladder, they resemble generally an Egg prosped flat, or they have three different Diameters, Length, Breadth & Thickness, & it is very material to know this when you are about to extract them, so much depends upon catching the Stone in a favourable way. Next attending to the Surface you find that many of them are unequal, & the inequalities are often very regular, resembleing the Crystalls of Salts, or there is a Crystalization in y^e^ Calculi. Next we find that they have Concentric Lamellæ, & these are seldom the same throughout, which points to an useful enquiry, for the Lamellæ depend upon an unequal growth, & are occasioned by a variety of the Constitution, or by a Variety in the manner of life, the Constitution remaining the same. Next where there are more than one Stone in the Bladder, we can determine that from the appearance

of the Stones, for one makes an impression upon another, or such Stones are polished in certain places, & want the round figure wc they generally take otherwise. In some of the Stones the pressure is very remarkable, and a great number can be put together so as to form a figure perfectly regular. so I show you 13 or 14, which formed two quite regular like the Brass handle of a Door. Many have been divided as to the manner of the appearance, some supposed that a large Stone had broke into so many pieces, others imagined that a No of small Stones by pressure had assumed that shape. Now the latter is certainly true, for I have since got three Stones, two of which make a regular figure, & I can perceive that two such Stones have formed the third, we see the Rima where they are joined, & on cutting the Stone we find a Septum, where the two Surfaces connected, each having its Concentrated Lamellæ. I formerly suggested that the formation of Calculus might depend

depend upon a Variety of Causes, a number of which might be very easily conceived, so we are not to imagine we can always explain it from the Diet, or that it depends upon the Kidney entirely. There may be many other circumstances, the absorbent Vessels of the animal may have great effect, the intimate structure of the Kidney, the nature of the general Excretories of the Body, allowing the useless and abraded parts to pass thro' the pores of the Skin, the Dilution, the time the Fluids stagnate in the Receptacles, the posture of the Body, the habit of retaining the Water, the negligent manner of making it in the night time, particles of Blood falling into the Bladder & attracting the Stonny matter, as threads put into a Solution of Sugar, give it the appearance of Crystals, as in Sugar Candy. Uniting the Variety of these Causes then, we would conclude that a Stone may have its first beginning in the Bladder of Urine, and

we

we are not to look for the Descent of it from the ~~Ureters~~ Pelvis of the Kidneys, tho' this is very common, and we can frequently trace it by the Symptoms, which are very easily distinguished, and generally well described. When it has fallen into the Bladder we endeavour to discharge it by a proper posture of the Body, by relaxing Fomentations and Injections, by the use of Opium to take off the Contraction of the Sphincter, and by a proper posture in discharging of the Urine, as sitting on the knees, & leaning forwards to throw the Stone immediately over the passage.

Next, suppose that a Stone has formed in the Bladder, or got into it, how are we to distinguish it? There are a great variety of Marks which enable us to distinguish it, i.e. a probability approaching to certainty. The Patient finds always an uneasiness on motion, he is perhaps tollerably easy when sitting or lying, but on getting up to walk he feels an uneasiness. Next he has generally a frequend de-

sire)

desire of making water, from the irritation, in consequence of which also he passes it in small quantities. Next there is a difference in the Colour of the Urine, it is generally of a paler Colour in Calculous Cases &c. may depend upon the stone attrading the Earthy particles, but likewise on the affection being communicated back to the Kidney, just as y. Colour of the Urine varies in feverish Cases. Next the uneasiness is increased if the motion is of a jolting nature, as riding on Horse back, or walking down Stairs. On passing his water, tho' he has a strong desire, he finds a great difficulty, the irritation making the Sphincter contract, or the flowing may be mechanically stopped by the Stone falling on the neck of y. Bladder, so when he has nearly emptied the Bladder he relaxes all the parts, the knees are set at a distance to prevent the pressure & the Trunk bends forwards, not from particular Muscles being irritated, but because

because the Muscles are then most relaxed, but still on passing the last drops the pain is greatly increased, the Stone being brought more to the neck of the Bladder, which is the most sensible part of it, & he feels a pain extending to the Glans of the Penis, just as a person after amputation feels the pain in the Foot, referring it to the termination of the Nerves, not to the middle parts, which are irritated by the Calculus. Then the Blood passes after violent motion being made, and sometimes Sand.

These, and a few other circumstances render it probable that a person labours under Calculus, but a Cancer or Ulceration, or small Sand may produce the same kind of feeling, so before any Operation be performed, it is necessary to Sound the Patient by introducing a Probe into the Bladder.

Now suppose that in Consequence of Sounding, I am certain of the Disease, that I feel a Stone, am I to trust to Internal

Medicines

medicines for the Cure, or to Injections made into the Bladder? I apprehend we are to trust to neither, nor have we clear proof that either has very great effect, at least not such as many Physicians seem to conceive. I would add, that it is far from being certain that by Caustic Alkali, Lime Water, Soap &c. we can prevent the generation of Calculus. That is suppose a person cut for the Stone & given proof of Calculous disposition, & especially if there has been more than one Stone, we cannot promise that we can prevent the return of the Disease, & the reasoning upon this Subject is to be set aside entirely, it is not worth mentioning the effect of the Caustic Alkali, that it passes into the Kidney, and wanting fixed air draws it from the Stone, which in consequence of this falls to pieces and dissolves, for the Caust. Alk. is soon changed in the Stomach & Intestines, whose acids or ascescent matter is always contained, so it can have no more effect than

then a Neutral Salt, but I appeal to Experim^ts and there is not a single proof to lead us to believe that we possess a Medicine of such power, far less that we can by any Medicine dissolve a Stone that is confirmed, this is alledged, and one Case in particular of this kind was published, but I know that there was a mistake. The Stone was supposed to be dissolved, as it could not be felt but afterwards another person turning the Patient into different postures discovered it. Bona fide the Case was related as just, but Surgeons snugnully by a Probe do not discover a Calculus tho it is present, neither would I trust to Injections made into the Bladder, it was proper that these should have been contrived, & Dr Butter has contrived an apparatus for the purpose, it consists of a Bladder intended to be filled with Lime water and Soap &c and it is put between two boards, by which the Patient can press out the liquor, the Bladder has two pipes fitted to it, one for

the

the Male, & another for the Female, it is introduced into the Urethra, and in the Female it may reach the Bladder, so more room for pushing the experiment, but in the Male it is attended with pain, which at last comes to be quite intollerable, so that this practice came to be laid aside, in the Female however if we could find a proper Solvent, we might try it, as it has a better Chance than the former way, where the Stomach & Constitution are at the same time injured, & I will venture to allledge, that if you were to take any given number of Calculous Cases, suppose 100, and treat the one half of them with Lithontriptic Medicines, and on the other half perform the Operation, while not one of the 50 perhaps had received a compleat Cure, many of them might draw easier, but that might have happened without the use of any medicine at all, owing to the Bladder perhaps growing Callous, the Coats becoming thicker & feeling less pain.

Lett. 9th

Lett. 9th of 2d Comm. on Mr. Sowerby's operation

Lecture 97th

To our last Meeting I alledged that, whether we consult the reason of things or appeal to Experience, we are so far from knowing any Remedy which possesses the power of dissolving Stones already formed in y Bladder, that we cannot clearly show that our Remedies prevent the generation of Calculi, & therefore as the Remedies commonly employed hurt y Constitution, I alledge that the operation is the last resource, & this aught to be done early, for the Stone in the Bladder affects it in a way that comes to be dangerous, occasions a contraction & thickening of its Coats, the Prostate Gland may also come to be affected, & the health suffer greatly, so the danger of the operation is increased, where the Calculus has lodged long, & the Inflam: from the Operation & exposure to the air comes to be more dangerous.

I read

I next mentioned the particular circumstances by which we judge with a degree of probability that a stone is lodged in the Bladder, but none of the Symptoms are absolutely certain, so a Surgeon ought first to feel the Stone by a Probe of a proper shape, introduced within the Cavity of the Bladder, or y. Pat.t ought to be Sounded by introducing a Probe called a Sound into the Cavity of the Bladder.

The Probe ought to be the most hard materials of Steel. Surgeons use a common Instrument made of Silver for drawing off the Water, but it is better to use a hard metal which communicates the Tremor more sensibly to the hand, we make the Instrument not only smooth but we accomodate the shape to the passage in the Male. Now the method of employing this Instrument is perfectly simple, the Patient is to be laid on a Table nearly of the usual height, with his shoulders raised a little with Pillows to slacken the

the parts, & to bring the stone forwards towards the neck of the Bladder. When the Surgeon places himself before the Patient between his Knees, or he may stand on the left side, if he be right handed. Now if you had never seen a Surgeon do this operation, you might probably do this operation right i. e. that as the Probe is accomodated to the passage, we keep it in that direction, but Surgeons have got into the absurd practice of entering the Instrument in the reverse way till they can get it no further, when they make a turn. Now this is attended with no advantage, the Patient suffers in turning the Probe round, & the Surgeon may in that manner miss the passage, especially if he appears to do this with great dexterity, & turns it quickly round. The Instrument ought to be made warm by laying it in water, then wiping it, we rub it over with an oily substance,

as

as Butter or Axunge, for the thin oil rubs off before the Instrument gets into the Bladder. In introducing it the two hands ought to cooperate, we prop in the Probe with one hand, drawing the Penis over it with the other. There is always a Contraction at the neck of the Bladder, owing to the bulk of the Prostate Gland & the muscular fibres collated into the Sphincter, & here if the Surgeon fuls a resistance, he generally introduces the fore finger of the left hand into the Rectum, as they say to raise the point of the Instrum.t, but that is better done by depressing the handle, so the only use of this practice is, that after we are within the Rectum, we draw the Sphincter of the anus towards us, & stretch the Urethra, & make it straight, but the effect is not equal to what Surgeons expect, & the principal Rule is to work gently, & to keep the point in the very axis of the Passage, for the end of the Probe may be resting against a solid. after it is within

within the Cavity of the Bladder he turns it round in all directions, & he is particularly to remember the shape of the Bladder, that in y. adult body the mouth of the Urethra is not the lowest part of the Bladder, so that by turning the Instrument backwards he may strike the Stone, but if he still misses finding it, he now introduces the finger into the Anus, that with the point of it he may press up the Stone, and you can generally reach with the finger above the Prostate Gland. If still the Stone is not felt let the Patient alter the situation of the Body, stand up, lean forwards, or sit upon the knees, leaning forwards, which brings y. Urethra to be the lowest part of the Bladder, and throws the Stone upon it. After he comes to rub upon a hard substance, & feels a Tremor, he concludes that there is a Stone, but let him be cautious, for a few grains of Sand may give that Sensation, so he should shift the point of the Probe, & y. the

the Stone is of considerable size, he feels it after making some motion, nay one may be able to guess the size of the Stone from sound.

I suppose then that he is satisfied of the presence of the Stone before he proceeds to operate, especially if the Patient has been subject to Nephritic Complaints, & if Stone seems to have begun in the Kidney, and to have descended into the Bladder, he ought to put the Patient on a course of Diluent Medicines, or some of these called Lithontriptic, in order to wash Sand or small Stones from the Cavitys of the Kidneys, and he should attend to the Season of the Year, avoiding the Extremes of Heat & Cold.

The propriety of the Operation being determined, let us next consider the Various Methods which Surgeons have attempted or proposed, & I shall first give you a general description of them, & after that choosing what I shall prove to be the most fit, I shall perform it, and without

without attending to the order of time, and shall explain them in a way that shall be very easily understood.

Before Anatomy was much cultivated, in the days of Celsus, they attempted to extract the Stone from Children by introducing one or two fingers of the left hand into the Intestinum Rectum, & pressing the Stone forwards (the Patient being put in a proper posture for the purpose, viz. on the knees of another person & the Thighs raised) to the space between the urethra & the Bones, the Os Ischium, the Surgeon next made an Incision upon it, brought it in view by a Crucial Incision, then it was turned out with the finger, or with a scoop. Now surely as we are cutting in this manner at random, cannot we see what part may fall between the Stone & Tegumenta, that method is not at all to be thought of

Afterwards a safer method was proposed

proposed, after the Patient was put in the proper posture, and secured, a furrowed Probe was introduced bent like a Sound, but with a furrow, now this was introduced into the cavity of the Bladder, then the Surgeon entered the point of a double edged knife, or Lancet into the Urethra, where it makes the turn from the Perinæum to run up into the Bladder, or where we lose it, he then laid aside his lancet, and run a Conductor along the furrowed Probe into the cavity of the Bladder, and having no further use for the furrowed Probe he took it out, & introduced another Conductor upon the first into the Bladder, which was forked at the point in order to run upon it, the one was called the Male, the other the Female Conductor.

The next step in the Operation was to tear open the passage, to make it wide enough to allow the Instruments to enter, and that now is the meaning of having two Conductors, the Surgeon by separating these, tear open the part as far as the neck of the Bladder, then

intro

introducing a pair of Forceps along the Conductors, & withdrawing the Conductors you search for the Stone & extract it. Now this is called the Operation with the greater Apparatus, & it is no doubt an improvement on the former Method, because we are led certainly to y^e Cavity of the Bladder, but we would not think now of following it, for first we tear the parts instead of cutting them, & a Laceration must make a more dangerous wound than an Incision, & we tear often more of the Urethra than is necessary, for the Opening would be equally large supposing half an Inch had been tore, as when 3 or 4 Inches of y^e Urethra are tore open. Hence that Method, & every Improvement of it, as the cutting open the Urethra with the Knife (as like the several Blood vessels entering the Bulb of y^e Urethra are cut) must be discarded.

In the end of the last Century a very material Improvement was made on the Operation with the Great Apparatus by

Frere

There Jack an Ecclesiastic, he proposed & practised an Incision made into the side of the Urethra very near to the Bladder, or he introduced what is called on that account the Lateral Operation, & he continued the Incision thro' y^e^ neck of y^e^ Bladder, & then dilated it with the proper Instruments, & this Method with various Improvements is commonly practised, but of late years, from our tearing or cutting y^e^ Prostate Gland, & our being in danger of tearing the Duct of the Vesicula Seminalis, while at the same time the opening is conjoined by the Cervix of the Bladder, it has been proposed to make an Incision into the Bladder itself, between the Urethra and the entrance of the Ureter, avoiding the neck of the Bladder entirely. I shall now shew you the Instruments proposed for that purpose by Mons^r^ Fouberre a French Surgeon, as they have been joined together by ~~means~~ Mons^r^ Thomas. We make an Incision in the Skin with a Common Scalpel, then we make

make the opening betwixt the Crus of ye Penis & bulb of the Urethra, in the very place which I shawed as proper for puncturing ye. Bladder in the Male, or nearly in the place where we perform the Common operation of Lithotomy. We then take this Compound Instrumind, consisting of a Lancet at the point & in a groove a knife, which we can regulate by the handle, the 2. piece is a Wedge like Instrumind w.ch we call a Gorget, & which supplies the place of the old Conductors, now that is fixed to the other two pieces, & the Lancet is supposed to be large enough to carry in with it ye knife & the Gorget, suppose the Lancet with in the Bladder, I take hold of the Gorget in my left hand, & with the right I withdraw the knife, by which I cut a sufficient hole in the body of the Bladder, & I leave the Gorget in the Bladder ready for conducting ye Forceps, & this Method Foubere practised w. success, but in a few Cases he failed, owing as he said to the negligence of the Patient not retaining

ing

retaining the urine, but with all the precautions we can take, this Method will never come into Practice, for it requires a considerable degree of distension of the Bladder, whereas in (al:)most all cases of some continuance, the Bladder is very much Contracted. But next, suppose a sufficient distension of it, which may be known from the quantity of Urine the Patient can contain in it, & passes at one time, the Operation is rather too nice for most Surgeons, who may hit y. Bladder perhaps in a wrong place, but supposing the Incision made in a proper manner, the moment the Surgeon draws out his Instr.t it collapses, the wound of the Bladder slips away from the wound of the Tegements, and the urine insinuates itself into the Cellular Membrane, & spreads round the Bowels in the Cavity of the Pelvis, & we ought to add the danger of making Incisions of consid.le size in the body of the Bladder, from the admission of the air. Besides, there is

room

room enough in most cases for the extraction of Stones of very great size by the Lateral Operation, & we do not find in fact that the Ducts of the Vesicula Seminalis ever are divided, and Wounds of the Prostate Gland are not dangerous.

Now one more method only remains by. I think needs to be mentioned, for I put out of the Question a project of some, the cutting into the Bladder at the side of the Intestinum Rectum from behind, which is attended with danger & no advantage, so the only other, & what I shall show, is what is called the High operation, where the Incision is made above by. os Pubis directly into the body of the Bladder, wch. rises when distended much above the Os Pubis, first the Bladder must be distended, some have proposed to do this by throwing in Injections with force by means of a Syringe, but it is better to do it by tying up by Penis & letting the Urine Collect, nay the Patient ought for many weeks to accustom himself to retain the Urine as long as possible, that he

he may dilate the Bladder considerably, and we judge whether the Dilatation be sufficient by observing the quantity of Urine discharged, & by feeling the fore part of it, for you may distindly perceive it all round, providing you relax the abdomen properly. As the throwing in water would incommode us a little, I shall blow in air, the Patient is laid on a Table, w^th the Shoulders low, that the parts may be fully on the Stretch, & the Surgeon begens ye Incision in the very middle, cutting from the Os Pubis up towards the Umbilicus, & his first Incision ought to be of considerable length, perhaps 3 or 4 Inches, to give abundance of room, & after dividing, I next cautiously cut thro the Cellular Substance, then I separate the Rule or Pyramidal Muscles, which you know are sometimes wanting, I next meet with the Cellular Substance that is on the outer side of the Bladder, then I am absolutely certain of going into the Bladder, & for that purpose I use a sharp pointed concave edged knife

knife, directing the edge of it upwards, & putting the fore finger of my left hand on the back of it, which is the surest Conductor, & I can at pleasure dilate the Incision upwards or downwards, I then introduce the Forceps guiding for y. Stone with my finger I readily direct the Forceps to it, lay hold of it, and extract it. Now this will appear so practicable, that one really is prejudiced in its favour at first sight yet it has from practice been almost entirely laid aside, & I have a strong Suspicion that they are right in doing so, tho' I cannot for want of data prove it. It has perhaps been done 100 times in Great Britain, & I have a most distinct account of the Operation done in this way by the late Mr. Smith of Perth, who cut more persons than usually fall to one mans share. He had practised the Lateral Operation with success, seldom under 4 years of age, and seldom, in persons above 40, & one of ten only died in the Lateral way however he cut one time 22 Patients without losing

one

one, in this manner he performed the operation 18 times, and of that number 8 died, he had the opportunity of examining the Patients after Death, & he found the Bladder & the whole Bowels of the Abomen in a state of high Inflammation, & there is more danger than Surgeons are aware of, from Incisions of the body of the Bladder where the air gets very freely, besides that the Bladder instantly collapses & the wound slips below the Os Pubis, & where the Inflammation is considerable there is even a necessity of getting the Urine out this way by means of a Canula, so it is right that the Surgeon should know this way of doing this Operation, but so far as Experience yet goes, we return to the Lateral Method in all its steps and improvements, & first I shall give you a notion of the Instruments employed. We begin with tying the Patient, tho some do not tie the Hands till after the Sounding is over, which is sometimes the most tedious

Part

part of the Operation, & generally when y^e Sound is into the Bladder the Operation is half done. So suppose the Body properly secured, & the Sounding performed, the Surgeon must introduce a furrowed Probe, & endeavours to adapt not only the curvature, but the size of the Probe as nearly as possible to the size of the Urethra, & we are not to imagine that it is more difficult to introduce a large Probe than a small one, which is more apt to catch the Rugæ in the Urethra, or to make Rugæ, whereas y^e other stretches the Membrane, & prevents Rugæ from forming. As the Probe is to be withdrawn before the Operation is quite finished, certainly we do better than the French in leaving the furrow quite open at the end, for when it is stopped at the end, it is not so readily withdrawn, when the Gorget is introduced. After we have introduced the Instrument, we give it to the management of an Assistant, who turns it over, if the Surgeon be right handed, to the left side, or Vice Versa. We

then

then begin the External Incision, which is to run
between the Crus of the Penis & Bulb of ye urethra,
or we begin it where the urethra & Crus Penis
meet, & continue it in a slanting direction down-
wards to the space between the Os ischium &
the Anus, & the Common Convex edged dissect-
ing Scalpel is the best Instrument, with this
we divide the Skin & fat, then the Transversalis
Penis, then the Levator Ani, with ye Cellular Substance
within, after that the Surgeon introduces his
finger at the Wound, & he can distinctly feel
the Staff, thro' the Membraneous & Cavernous
Substance of the urethra, but he pushes down
to the part of the urethra that is Membraneous
only, where he feels the Probe quite thin, for
that is the part we ought to cut. The Cut
is to be made either with the same knife,
or generally we take a small knife. Sharp
represents one with two wrapped round it,
which is always troublesome, & we can
make a knife sharp at the point our self.
With that Gum to open the urethra by

turning the

beginning the edge towards the furrow, & the back
towards the Intestinum Rectum, dividing it with
the fore finger of the left hand, so that we are
in no danger of wounding the Rectum, & where
that is done the operation has been performed
in the most bungling manner. Nay I am so
far from apprehending any danger, that I would
prefer one double edged at the point, in order
to make a sufficient opening in the membrane.
Next instead of tearing the passage with the
blunt gorget, we ought to cut open the passage,
& for this purpose there have been various con-
triviances, some do it with the knife viz. which
we open the Urethra, with the back turned
towards the furrow. But we ought to
accomodate our Instruments to all Surgeons,
for if the Surgeon is hurried & turns the knife
wrong, he may cut down into y^e Intestinum
Rectum, so we should endeavour to put this
out of their power. An Ingenious French
Surgeon LOUIS has attempted this, he
introduces an Instrument quite horizontally
into

into the hole in the Urethra; which has a groove in it (but there is surely no need for the Spirit Level which is here added) then he takes a knife & enters it into the slit & pushing it on into the Bladder the Incision is made always in one Direction, & this is by no means a Contemptible Instrument, but Lewis has made his cut too much backwards. We have however Contrivances better than this still. Here is an Invention of Frere Combs, we enter a kid knife which we can regulate by turning the handle, it is introduced into the furrow, and we thrust it into the Bladder, then withdrawing the staff we open the knife, pull it back again & so make the Incision. and Frere Comb has in reality cut a vast number of Patients in this way with great success several hundreds, and it must answer tolerably well. But we have still a better Instrument the invention of Mr. Hawkins, an Ingenious Surgeon in London, which is the sharping about an Inch of the side of the Gorget, so that it cuts as

as we push it in. The advantage of this over Frere Bombes Instrument is that it makes way for itself, while his only cuts as it comes out, so may tear the Vesicula Seminalis, & the only objection I see to it, is, that as the Gorget is to remain a considerable time in y^e Bladder, in order to introduce the Forceps upon it perhaps a second or third time, without any want of Care the Bladder Collapses, the Bowels fall down, or the Patient by his Cries pushes them down, & the Bladder is cut upon the Gorget. Now that can be remedied in y^e greatest case, by making fixing a blunt Gorget to the sharp one, or making a double Gorget with a Nail to keep them together, now we take the blunt Gorget back about an Inch, & holding them as one Instrument Enter the sharp one into the Bladder, making the Cut sideways & a little upwards, whereby I avoid altogether the Seminal Ducts, as well as the Rectum, & when the neck of y^e Bladder is split, I pull back the sharp Gorget, and let

be the blunt one remain with safety. I need not detain you with another Instrument of Le Cat's, who makes a Gorget with a knife fixed to it, but this shape is more unfavourable than the former &c

After we have got in we lay hold of the Stone with the Forceps, & the very best kind is the most simple. The Blades don't meet all to gether, lest they catch the membrane of the Bladder, they are made a little hollowed & the Teeth near to the point, & we make the Forceps for Common use straight. It is alledged that we need Crooked Forceps, where the Stone is lodged in the portion of the Bladder, which is behind its neck; but they are never to be used without absolute necessity, & I hardly think that a case will occur, where with an assistant putting a finger into the anus we cannot lay hold of it. It is true the inner Coat of the Bladder may push out between the Fasciculi of the Muscular fibres, & the Stones be

engaged

encysted. There is another contrivance which too is unnecessary, after grasping the stone you turn this Screw, & fix the Instrument to prevent the Stone from being broke in Extracting, but it is better that the Surgeon regulate the pressure upon the Stone with his hands, he takes hold of the blades of the Forceps with both hands, & by introducing his fingers between them, he prevents them from pressing too much.

Now after having described this Operation you will readily understand the method of doing it. I begin with tying a Ligature, I make a running knot upon the Wrist, then I desire the Patient to put his hand upon his Scrotum, & I bring one of the turns over the foot, & the other under it, & cross again at the other side, then make a running knot. Next bring the Body over the edge of the Table, raising the Shoulders. I then introduce the Staff which I give to an assistant, who takes it with his right hand & turns it toward the Os Ischium, which

with

with the other he supports the Scrotum, & other
Assistants manage the Knees & the Feet. I
now begin the Incision, the place of wch is
easily found, & this operation is really so
easy that I could do it in the dark, just as
well as in day light, because I am guided by
the feel, I feel where the Crus of the Penis joins
with the Urethra, & I am sure that the inner
Incision cannot go higher, but I may make
the outer a little higher, tho I have heard of
one case where the Operator began so high
that the Testicle dropt out of the Scrotum.
It is of advantage however that the first In-
cision be 3 or 4 Inches long, even tho' Stone
be small, and in doing the Operation the
Surgeon is to study his own ease, he is to
place himself so as his hands do not shake.
The French put one knee to the Ground, a
just a position in doing an operation.
We make the next Incision thro' the Trans-
versalis Penis, or Corenoi, & dividing that
muscle the Crus of the Penis presents, I

then

then cut thro' the Levator ani. often some small Blood vessels pour out some blood, & I have seen a necessity of taking up these with the needle in some cases. We now feel for the Staff, and turning the knife towards it make y^e Incision thro' the membrane of the urethra, and it is material that we should divide y^e membranes freely, lest our Instrument should slip upon the outside of it, but we can feel the staff perfectly bare, & there is room to admit the point of the finger. we now take Hawkins's Gorget, & introduce the button of it into the furrow of the Probe. Now Surgeons commonly take the staff from the assistant, that their two hands may co-operate, but it would be better to let it alone, & to guide the Gorget w^th the fore finger of the other hand into y^e groove, only the assistant must draw the staff towards him, till the Concave part of it presses against the Os Pubis, whereby all parts are made slack upon the out side. Having thus introduced the Gorget into the Bladder, we have no

further

farther occasion for the staff, so we with one
it, & enter the Forceps upon the Gorget, with
which we search about for the stone. If you
feel the Stone in the neck of the Forceps you
move the leg which is uppermost, and if
the Stone is not raised sufficiently, you
introduce the finger into the anus, and you
are to remember the three diameters of ye stone,
& not to grasp it fast, but to take a moderate
hold of it, that it may turn round, & the end
present, and we may even assist by introducing the finger. After you have got it
into the upper direction, you turn ye Blades
towards the os Pubis & Perineum to defend
these, and pulling down we work very
gradually, as in the Delivery of a Child, pull-
ing downwards & backwards, because
there is most space there. —

Next suppose that the stone has broke,
or that there are a number of small stones,
the Surgeon generally only repeat the introduction
of the Forceps till they are all extracted,
which

which is attended with great pain, and the Patient in such Cases generally dies. If the Stone has broke therefore, after the Surgeon has brought away the larger pieces with the Forceps, for the smaller we use a Spoon, or if they are numerous and very small, we would set the Patient erect on his Legs, and introducing a large pipe of a Syringe throw up Matter & Oil to fill the Bladder, stopping the wound till the small Stones have time to fall to the bottom, whereby we may wash them all out at once. We then lay the Patient's Legs together, put some dupsint upon the wound, & over all a Poultice to lessen the Inflammation, this keeps out the air, & sucks up the urine, so is attended with manifest advantage. To prevent the Cloths from being wet, you roll a sheet & put below the Patients body, & some tough greasy substance may be rubbed upon the skin arround the edge of the wound to prevent Excoriation. Lastly

Lecture 98.th

In the present way of performing ye Latoral Oper.n of Lithotomy, we trust a good deal to the assistant in directing the convexity of the Instrument towards the Os Ischium, the groove being on the back of the Instr.t so as rather make the groove on the side of it, when the assistant has merely to hold the staff quite straight, & I would next cut the left, or blunt side of the Gorget, w.ch is in danger of tearing the parts, as the Vesicula Seminalis, on putting it back. Next in order to be certain of going into the Bladder, I would make a large Button to enter the perinæum, when instead of it being made round it may be made flat.

If the Stone has made its way into the beginning of the Urethra, & has remained there some time, & increased in size, we cut directly upon it, & if we feel distinctly, we scarcely need ye. direction of a Staff, but if the Stone be very small, tho it be too large to be pushed forwards, we take the assistance of a staff.

If by touching it we can throw it back into the Bladder, perhaps it may be better, as it may be difficult to lay hold of it in that place, after making the Incision, but we are never to use force here, for if it has remained any length of time, we can not push it back without doing material Injury to the neck of the Bladder. Suppose next that a small Stone beginning to form in the Bladder, has got forwards a certain way in y^e Urethra, & then stops, if we can't bring it the whole length, by pressing gently with the hand, the Catheter at the same time making the effort of emptying the Urine, (& we may previously throw some oily matter into y^e Urethra) it has been proposed by Sandorini & Hallet, that we might introduce a hollow Tube into the Urethra till we touch the Stone, then passing thro' it a pair of Forceps which open with a Spring, so that on drawing back the Canula the Forceps expands, & you endeavour to slip y^e blades between the membrane of the Stone, & when you push down the Canula, to grasp it, and

and endeavour to extract. Now I am doubtful if you will after be able to succeed to y. Instrument, & you may assist nearly as much by the pressure on the outside with the hand, as you are in neither way to use much force, as the Cat. will receive more material Injury, than by the only remaining way by an Incision; in making the reasoning merely upon it, we would think it best to act merely upon it, making the opening in the Skin & Membrane of the Urethra at the same place, lest when the Skin is retracted, y. Urine should get out under the skin, & be diffused yet Experience shows that the Cat is a safe, & so evidently the best method of operating so we draw the skin strongly forwards, then cut directly upon the Stone, & turn it out with a Probe, then we allow the skin to slide back again, which confines the Urine, or should it get out we next try the pressure of the hand, if that still is insufficient you may introduce a bit of flexible Catheter, & if all fail, the last remedy is the making the Incision of the skin, directly

directly opposite to the Incision on y^e urethra, & the Bal^r is in no worse a situation than at first.

Is I have got a fresh Subject, that I may operate upon the Eye in the most entire state possible, I shall next proceed to the Oper^n of y^e CATARACT, by which is meant an Opacity of the Pupil of the Eye, which we readily perceive, & which we find in 99 Cases of 100, situate in y^e body of the Chrystaline Lens. In some few Cases the capsule of the Lens grow opaque, & I've seen one of the 2 Cases where a thin film grew from the Iris, covered a small part of it, & extended across the Pupil. The Disease sometimes begins from external accidents, as from a blow upon the Eye, & where it begins in the way we observe, that a little time, & concealing y^e Eye from light is sufficient to remove y^e Complaint, but generally, this Disease comes on very slowly, & in the most equable manner, on both the Eyes at the same time, in other Cases we observe it in the one only, & instead of Jas. Fuller

affecting the whole body of the Lens. I have observed it begin in a number of points which extends & unites till the whole Lens appears of an uniform consistence. In some cases where the Disease comes on very slowly, we observe a whiteness & opacity resembling the colour of milk, & where an operation is done, we sometimes find an unequal consistence, we find a quantity of opaque humours, which is more readily on the surface between the Capt. & the body of the Lens, being naturally much softer on the outside, than in the middle, whereby it forms a picture that we can imitate by art, but I've seen the whiteness go thro' the whole body of the Lens, & the whole substance of it rather softer than is natural. But in 19 cases of 20 the Lens becomes of a yellowish colour, resembling amber. I've seen several hundreds of Diseased Lens in the possession of Baron Wenzel, & by far the greatest No. of them were of such a Colour, & I am certain that all he showed me had been diseased, for

When

when we dry the Lens from a recent Subject, it has a very different Colour. This Colour Sharp compares to tarnished Steel, but it is more of a yellowish brown Colour — Now are we to imagine that Remedy can remove the Disease, or what Remedies are we to attempt to Cure it by? Mercury has been often tried, but for the most part to little purpose, of late years the Cicuta, & still later the Pulsatilla Negricanes. Now this last we have had no opportunity of trying in this Country. It possesses a singular property of affecting the Eyes in a sound person, a small quantity being taken in the Stomach, but from attending to the progress of the Cataract, & observing what happens in old animals, as well as an appeal to Experience, there is reason to doubt if we can make much Change in it, for in all old animals it gradually contracts the same kind of Colour, & where it comes on equally on both the Eyes, it is more a failure of that particular of the Constitution, & it is as difficult to prevent it, as to prevent the failure

J

of the whole. I mean not however that any reason
ing of this sort should prevent y^e^ proper trials, only
we would avoid any Remedy, that would hurt y^e^ Pat^ts^
Constitution. Suppose then that we are under the
necessity of having recourse to a Surgical Operation,
and before we undertake that, we ought to be well
assured that that Disease is confined to the Lens,
& likewise of other circumstances w^ch^ respect to the
Lens & Eyes in general. First let us be assured
that the bottom of the Eye is sound, & that the
only fault is the dark substance interposed, or
let us observe that the Amaurosis or Gutta Serina
depends on the Insensibility of the Optic nerve,
& Retina do not accompany the Cataract, for they
often go together, there are many instances where
an Amaurosis is succeeded by a Cataract, one part
of the Eye being affected, the other gen^y^ suffers not.
Now you will recollect a fact y^t^ all y^e^ light which
strikes the Retina pass thro' the Lens, & that there
are no spaces between what are called y^e^ Ciliary
processes, & therefore if the motion of the Pupil,
or Contraction of the Iris be considerable, the

bottom

Mod. cure for a number of years, if the Lens was clear but generally the Amaurosis

bottom of the Eye may not be insensible. To ascertain this point we are to compare together the opacity of the Lens, & the degree of motion, when the other is shut, for you're collect that our Pupils sympathize, so that there may be a complete Amaurosis in the left Eye, yet if the right be sound, there will be in the left a considerable motion in the Pupil, for when the irritation is made upon the right Eye, the motion is communicated to the other, we return to the light then, only the Eye which is diseased, & if we perceive a tollerable motion in it, & that the Pat.t has not formerly been subject to head ach, nor Paralytic weakness in other parts we may conclude that the bottom of the Eye is in a tollerable sound state. next you will attend to the C.ts of the Pupil, for the bottom of the Eye may prevent its powers, & yet the Lens may have contracted preternatural (ashes coins ib. & Iris, so let us see that there are no membranes connecting them, to do this we turn the Eye to a strong light, & an obscure light by turns, observing

at

at the same time the shape of the Pupil, & if there are any adhesions, we will be able to distinguish that the regular Circle of the Pupil is altered, that on its moving one part remains fixed, & the other dilates, but if it all shuts in an equal manner, there is no adhesion. There is one caution further to be given - i.e. if that the Disease be confined to one Eye, we ought not to risque the sight of the other, by doing any Operation, nay, tho' we could by a wish remove the Cataract, the Pat. receives very little benefit, for he can not apply both readily to the same object, or (adopt Glasses to them readily, so we are only to operate when both Eyes are affected.

Supposing then that we have found that the bottom of the Eye possesses its power,* we ought to confine the Pat. for some time to a strict Antiphlogistic Regimen, for the consequences of the Operation are sometimes greater than we would expect, & the Inflammation often defeats the purpose of the Operation.

We next attend to the Methods of Operating,

* if there is no adhesion & both Eyes are affected, before we undertake any Operation, we understand and

and the Operation consists in the Mechanically removing the Curtain from the Pupil, or axes of the Eye, &c. may be done in two ways.

The most ancient is to thrust a needle into y. Eye, & to push y. body of the Chrystalline Lens away from the Axis, & lodge it at the bottom intangled in the Vitreous humour, & this is called depressing or touching of the Cataract, but as the Lens frequently starts up again from the place, & y. Operation needs to be repeated, while every after attempt is attended with more difficulties than the first. Of late years instead of depressing, it has been proposed to extract the Lens, to take it out of the Eye, perhaps accident more than reasoning led to the attempt, but the first person who pointed out distinctly the method of doing it is Mons.r Daviel, about 20 years ago, and I shall begin with shewing you his Method.

With the fingers the Eye lids are drawn asunder, & the ball fixed a little, an assistant supporting the upper Eye lid. The Surgeon places himself before the Patient, & the assistant behind him, then

then he takes a Lancet fixed in a handle, & the back of it bent a little, & makes an opening in the lower part of the Cornea, then he introduces a blunt pointed double edged knife, with wch he enlarges the opening, cutting sideways, first with the one side, then with the other, then he introduces a pair of Crooked Scissars, having their Curvature adapted to that of the Cornea, & with these he continues the Incision wch, in order to separate the lower half of the Cornea from the Sclerotica, then he lifts the flap of the Cornea with a blunt Spoon, and makes a moderate pressure upon the ball of the Eye, bursting the Capsula, & he introduces a Needle thro' the Pupil, & cuts the Capsula, then making a moderate press wre, he pushes out the Lens. Now this Method requires that the Instrument should be very dexterously put in & taken out from the Eye, it appears complex, & tho' it may be executed with tolerable safety, I apprehend that we have other methods of are very simple and preferable.

Soon after the Method was published in the

the French Memoirs, some of the French Surgeons, soon after Mr. Sharp showed the possibility of doing the Operation with one Knife, w.ch they separated the lower half of the Cornea, introducing the point of the Knife at the Cornea on the outer side & passing it betwixt the Cornea & Iris, they brought it out at the other side, then bringing it downwards they separated the Cornea. Still later, a most dexterous Oculist Baron Wenzel has practised the Operation with a lancet blunt on the back, & he makes his Incision in the manner now described without using any particular Instr.t to confine the motion of the Eye. Now for want of such an Instrument the Operation is not to be executed without tollerable Care, & I apprehend a very great Improvement has been made by an Oculist now in Town, Mr. Miller, who had formerly a contrivance for opening the Eye lids, and fixing the Ball of the Eye, like one pointed out by Sharp with a Spring, but this may open with too much, or too little force, so we prefer

prefer that invented by Mr. Millar, wh consists of a circular piece for taking in more than the Cornea, & we have them of different sizes, we apply such a circle then to the fore part of the Eye, it has a bent stalk coming from it, wh keeps down the under Eye lid, while the upper Eye lid is received into the groove, after fixing the Eye by means of it, we make the Incision with such a Lancet as Winsel used but smaller on the outside of the Scleroses, & a part of the Speculum may be left incomplete, that we may remove it if we choose before we bring out the Lancet. I observed in Winsels Operations, he made use a general rule after making the Incision to introduce a bit of Steel rough at the point thro the pupil, & with it tore the membrane of the Chrystalline Lens, after which he made a slight pressure upon the ball of the Eye, & I see no doubt that the success of his operations depended in a great measure upon this, for if without that we make our pressure in an unguarded manner we burst the posterior Capsula

Capsula as well as the Anterior, & a part of the Vitreous humour will be discharged. May in one case where there was a considerable resistance, owing to a thickness of the Capsula, he introduced a small Lancet Cadged in a Canula, w^ch reached the Lens, then pushing it into the Lens he allowed it by the Spring to fall back. Now these are the Instruments that we need and we shall next try them.

Before we begin, we must be careful to put the Pat^t & ourselves in a proper posture. Winsel was particularly attentive to this, the Pat^t was seated on a Chair of the common height, then he seated himself before the Patient, but a little to one side, according to the Eye on which he was to operate, he then put his foot upon a Stool of such a height, that when he raised his Elbow upon his knee, the hand was on y^e same height with the Eye, now we should have some better rest than our knee, we may sit the Pat^t in a low Chair or Stool, or at the side of a Table, we then fit the Speculum to

A that y^e Surgeons Elbow may rest on y^e Table

to the Eye, putting the upper Eye Lid into the Groove
of it is made first, & it is impossible for the Eye to
move, nay the rude touch of the Speculum in
stead of awakening the Eye moves, fixes it, brings
on a contraction of all the Muscles, just as
when we irritate the Nose slightly, a person
sneezes, but if not irritated it more rudely &c.
&c. &c. that effect is not produced, either
the parts are not disposed to move in that
manner, or there is such a motion of the
whole at once, that the Eye remains more
in its place, but the Surgeons trust to the
pressure it makes. When take the Lancet
in my hand, between the Thumb & fore fingers,
& rest my hand upon the Patients Cheek &
I enter the knife near to the edge of the Cornea,
keeping to the clear part that I may see the
Iris, & prevent an Effusion of Blood, otherwise
the nearer the better, because we throw the
Cicatrix more to the side of the Cornea, I have
made the Lancet somewhat like a wedge, that
it may fill up the hole, & prevent the aqueous
humour

humour from running out quickly, then carrying the knife across, & bring it out on y. other side, when I gently lessen the pressure, but still keep the Speculum there. Wilson has turned the Patient's back to the light, but it is better that an assistant should hold his hand before the Eye. I can now by pressure on the Eye bring out the Lens, but a skilful operator will do better by giving it into during a blunt probe to clean the Capsule, at the same time this is a dangerous Instrument in the hands of most Operators, & may considerably injure the Iris, or other neighbouring parts, so that perhaps such operators as have not much Experience in this Operation, had better content themselves in making an equal pressure on both sides of the ball of the Eye, at the same time, while bringing the Lens out, we cover the Eye from light, that y. Iris may not contract, & more room therefore be given. After the Extraction we apply Dressings, merely to y. End of excluding the air, wch has a remarkable bad effect upon the Eye. so in

instead of changing the Dressings in order to prow something of healing & Antiphlogestic nature into ye Eye, we put a piece of oiled Substance over ye whole perhaps keeping the Cloth wet w.th Rose water may be of service, & we may powr a little on the Cloth from time to time, we keep the Pat.t in absolute darkness, covering both Eyes till all pain and Inflam.n are gone, & the wound compleatly healed, that is several weeks. For tho' the Operation has been properly done, yet in some little time a darkness is frequently formed on ye Eye, probably in consequence of Inflammation, & you know that the Iris is an Organ not of great sensibility, has red blood circulating thro' it, and there are sometimes purulent discharges from it. We next attend to the way of

COUCHING, a practice w.ch has been long practised, yet no Operation in Surgery is worse performed, & less understood, it ought to be performed by Sticking a Needle into the Eye thro the Sclerotic Coat, ⅛ of an Inch behind the side of the Cornea, where the opening of the

the Eye lids leaves sufficient room, it is directed thro' the Adnexous humours to the side of the Eyes talline Lens, w^ch the Surgeon endeavours to push down to the bottom of the Eye, the Needle commonly employed is shaped like a Lancet in the point, & is somewhat thicker than a Common Sewing Needle, so it is difficult to know whether we are to get above the Lens, or press it down with y^e flat side of the Needle, or if we are to lay hold of it, but some of these Needles are made with a blunt Needle going along with it, & by a Spring the sharp Needle flies back, & the blunt one is left in the Eye, so in this Case the Operator meant to get the Needle above the Lens, & merely to press it down, but an eminent Oculist, Helmont, uses a needle of the Common shape, quite round as is used in Sewing, so he evidently struck the Needle into the Body of the Lens, spitted as it were upon the Needle. D^r Taylor sometimes practised in the one way, & sometimes in the other, he used a sharp needle, & seemed to have stuck it into the Lens, tho'

he

he meant to have depressed it only, but he used a sharp needle, & a round blunt one of Gold, he made the hole in the Sclerotic coat with the sharp needle, & sought for the hole w.th the blunt one. Now I am convinced not only from the success of Helmour, but from the reason of the thing, that it is best to stab the needle into the Cornea, we do not need a Speculum for this Operation, at least we may do it without one, for the needle fixes the Eye tollerably well, the Surgeon rests his hand upon the Cheek, brings his needle opposite the part to be wounded, pulling down the under Eye lid, whilst the assistant raises the upper, & he stabs it in at once in the Eye, & now he directs the Instrument so as to get between the Cornea & the Iris, which should be the next step till we see the point of his needle looking thro' the Cornea, he then makes a turn to the bottom of the Eye, & brings his hand forward in order to push the Cornea under the Vitreous humour, & he keeps it there for a few seconds till the humour settles, when he pulls

the

the Needle straight out of the Eye, he then immediately closes the Eye, & observes the Directions I gave formerly. Now which method ought we to prefer. If both Operations were to be executed with all possible dexterity, we should be much at a loss to determine. There is less Inflammation provided the Operation be done properly, after Couching; but then the one is a radical Cure, & the other may only prove a Palliative, then if the Lens is very soft, there is no possibility of Couching it, but you may extract it with a Spoon, or by injecting a little water, but I wd propose to prefer the Extraction to Couching to prevent Surgeons from pretending to do an Operation which they are not qualified for, but wound & tear the parts, so that when we take the number of Patients on wch I. Operⁿ has been done, more recover after Extracting than after Couching, the parts are seen in Extraction, but they are concealed in Couching, so we would prosecute the extraction of the Lens, till the Effects of it are better known.

Le Cat

Let us next suppose that from any cause, from touching or extracting, suppose the Crystalline Lens a membrane has grown across the Pupil, or that the Iris has been inflamed & the sides of it have been united together, during the Cure, we are surely in such a case, to make some attempt to restore the sight of the Patient, however small the prospect be of our succeeding, or we are to (Chesselden to attempt to) form an artificial pupil, he cut the Sclerotic Coat nearly where touch, & brought the point of his knife forwards till it appeared in the aqueous humour. Now instead of this I would make the Cut from before backwards, as we know that wounds of the Cornea heal readily, so a Couching needle may be passed at the side of the Cornea, lower than the axis, & we form our opening either streight or crucial, or we even can describe the circle, & there may be merely a membrane before the Chrystalline Lens, so we avoid wounding the other Coats, & perhaps tearing

the

the Retina or Iris itself, as well as the Choroid Sclerotic Coat.

Let us next attend to the Method of treating Accidents wch happens to Workmen, as when bits of Iron, or sharp Substances, stick in y. Cornea, & produce the most Violent Inflammation with excessive pain. We remove these by cutting the Cornea with a Lancet which we use in Blood letting, introducing the point, & cutting directly upon the Substance.

Lecture 99th.

In our last meeting I showed y. manner of performing the operation of cataract upon the left Eye, suppose the Surgeon to be right handed, but if the Disease is in the right Eye, he must either operate with the left hand, or he must change his posture, placing himself behind the Patient, or to prevent any changes of Posture, he may use another Instrument, also the invention of Mr. Millar, it is no thing

nothing more than the Lancet fixed to the handle nearly to a right angle, & the Lancet is made somewhat longer than the Diameter of y^e Cornea, & the Patient may be directed to look a little side ways, then having fixed the Cornea, he enters y^e Lancet from the inner side of it, & in this way he can execute the Operation as easily upon the right Eye, as upon the left.

Next, suppose that y^e Ball of the Eye turns Dropsical, & y^e Disease does not yield to the Common Remedies, we attempt the Humour by making a Puncture, & instead of a general incision of all the parts, the Vessels secreting y^e aqueous humour may be chiefly in fault, so we wd. first make a Puncture in the Cornea, with a Couching Needle. If the Disease shall return & increase to a great size, we would then make a larger Incision & push out the humours, that the Ball may shrink, & what will more empty the Ball entirely, we would make a large puncture with the Lancet behind the joining of the Cornea w^th y^e Sclerotic Coat.

Now

Now there is one Caution which I should observe here, that sometimes where water appears to be the cause of the Distension, it is in reality owing to the Cancerous Substance, so we should be cautious in the way of treating such.

In one Case I saw lately of this kind there was a clearness of in the fore part of the Eye, but there was large & hard swellings under the ear, upon the neck, upon the same side, so from these & the pains, the Patient, who was a Child suffered, I concluded y.e Disease was of a cancerous nature. Mr. Millar who attended the Patient with me, made a small puncture, & the Instrument went into a substance not thicker than a Clot of Blood, upon this we desisted, & the puncture healed up, but it afterwards broke out into an open Cancer, & killed the Patient, by the by, such Cases as these shows that there are Lymphatic Vessels in the Eye. If therefore it appears that the Eye is in this state, & that swellings are not formed in consequence of it, or that these

these may be removed, the next step is the ex
-tirpation of the Eye from its Socket Now that ap
-pears to be a very dreadful operation from y.
quantity of Blood vessels which are divided,
yet Experience has shawn y. y. oper.n may be
done easily, it has bun done twice in this plan,
& no very troublesome Symptoms followed,
we open the Eye lids, cut out the membrane
making the Connexion with the Ball, and
stop the bladding Vessels w.th Sponge. in like
manner it may be necessary to perform the
Operation, where the Lachrymal Gland is affected
with Cancer, & we can't get at it, we must
bring the Eye along.

Next let us consider y. Complaints w.th the
Ball of the Eye is concerned. 1.st You know y. the
Tunica Adnata, or Conjunctiva is full of Vessels
conveying red blood so this part is a frequent
seat of Inflammation, w.th sometimes is in
creased so much, that the Membrane is pushed
out double, between the Eye lid & the ball. In
such Cases where the common methods of lessen.g
Inflammation

Inflammation fail, Surgeons do service, especially if the Disease is not Scrophulous by scarifying the Membrane, or should y. Inflammation still continue, by cutting off considerable portions of it, D. Taylor gained great repulation by this practice, his Method was to lay hold of y. Membrane with a hook, or Tenaculum, or even by passing a round needle & thread y. Membrane, thus doubled then he cut on both sides of the Thread, left or more, with a lancet, or knife, or a pair of Convex Lips ars, this operation not only gives a discharge to the Vessels gorged with blood, but lessens y. pain greatly, which is increased by the Tears running along it, the part naturally defended by y. Slime of the Sebaceous Ducts being no longer the Gutter that conveyes them, but the inner and more tender part of the Eye lid.

Next, suppose y. a contrary Complaint, ty. y. edge of y. Eye lid from y. laxity of y. Skin, is turned inwards, by which hairs upon y. edge are directed against the ball, which proves

a

LIBRARY OF THE FOUNDED 1813 UNIVERSITY OF TORONTO

proves a cause of very great uneasiness & Inflam.n & for w.ch Surgeons are at a very great loss to find a proper remedy, Now I've seen a very great relief obtained by drawing the under Eye lid down.wds, then laying a large piece of sticking plaister first upon the Eye lid, then fixing it below y.e cheek, which hinders the Eye lid from taking again the situation, but if still the Disease recurs, we either cut out a part of the Skin to shorten it,* & cut out what is superfluous, or we may get rid of the hairs upon the edge of the Eye lid but we cut them in vain, for they grow again harder & sharper than before. Surgeons endeavour to pull them by y.e root, but generally, as much remains of the Bulb as grows again. now I've thought of cutting upon the Bulb w.th the point of the Lancet, and turning it down. —

Veal, in consequence of Inflammations of the Eye, & more particularly in y.e Tunica adnata, specks form on the Cornea, which sometimes appear like a thin Cloud semi-transparent

* we draw it but double till y.e Eyelid has got a proper situation, pass Sutures thro' it

semi transparent, while in other cases they have a greater opacity or whiteness, & in many cases, if you look narrowly you perceive distinctly a No. of red Vessels, which in 99 cases of 100 are not produced by the natural vessels of the part being enlarged by an Error loci, as Boerhaave speaks. I would be willing to admit the possibility of y. Error Loci of Boerh: but in this case it does not take place, but from the Tunica Adnata there is a growth of Vessels, which creep upon y. surface of the Cornea, there is an adventitious layer added in consequence of the Inflammation. Now this leads to a ready method of Cure. If the Speck be slight & y. Inflam.n of y. rest of y. Eye is subsided, I've repeatedly seen it disappear, where little else was done, but the defending the Eye from light, cold, heat, giving perhaps a slight purgative from time to time, & washing the Eye with Cold water, or in a small portion of Lead: Saturn: dissolved in it, but in other cases more powerful remedies are necessary, I know certainly y. Mercury given in

in a slow manner, to touch y. mouth gently for a length of time, has a great effect, for sun the whole Cornea assed as y. Tunica Conjunctiva, & yet after two Months very little dis appeard. But supposing that these Remedies have likewise failed, from the Disease being on y. Surface we are led to a Method of Cure, which has been long practised by different Oculists, the Dividing the Vessels w. a knife or Lancet, & in this way Mr. Millar has done more service than in any other of his Operations. His Method is this, he applies the Speculum Oculi, by w. he secures the Eye, & lays the Cornea in view, he then takes a Knife, or small Convex edged Scalpel, which is extremely sharp, & w. this he first makes Circular Cuts around the edge of the Cornea, & he further makes cross Incisions, dividing the trunks of the Vessels, w. he observes from time to time w. a magnifying Glass, nor is this all, but after making these Incisions, w. gives a good deal of pain, & repeating them perhaps every second or third

day

day at farthest. he next uses a practice we once can not see without fuling for the Patient, and I do not observe that the pain is considerable, he takes a peice of the Plaister, which appears to be Diachylon, but that is one of his Secrets, spreads on linen, and lays it between the Eye lids, folding the peice over the Eye lid, till the double edge touches the Cornea, he then presses together the sides, & fixes it on by Bandage, & he very fruely applies from time to time, a water with Camphor in it. Now without giving any Medicine inwardly that could have effect, unless perhaps Antimonial Vomits, we seem to have some singular efficacy, I've seen very great abatement in y^e Inflam^n. the Ducts conveying the Sebaceous matter are sometimes obstructed, & knots form, we generally inflame, suppurate, & discharge y^e Sebum, but where they remain indolent, and increase slowly, there may be a necessity for cutting out the Sebum by an Incision.

Next suppose y^e in consequence of these Operations I've mentioned, the ball of y^e Eye sinks, some

some endeavour to conceal y^e^ Deformity by an artificial Eye, a piece of Glass of which there is the representation of the Cornea, Iris & Pupil, these are admirably well executed at Paris. the person sits for the picture of the Eye, we introduce such Substances within the Eye lids, & unless y^e^ ball is allogether shrunk, it carries the plate with it, but the advantages, but y^e^ advantages which arise from their use, do not ballance the uneasiness they occasion, fretting the Eyelids at first very considerably, so perhaps the Patient had better be contented with concealing the Eye entirely.

Next suppose the Eye is weak, & we mean to defend it from the light, instead of doing it by a dark Covering, it is better to use an Instrument, which applies to the part readily & is supported with a Semicircular round head, & a Strap over round, and we cover y^e^ opening with a piece of Gauze.

The next Complaint which I mean to describe, has been treated of at great length by

by Surgeons, & many Volumes wrote upon the Subject, I mean the treatment of the

Fistula Lachrymalis, by w.ch Surgeons understand merely a Disease, w.ch interrupts in whole, or in part the flow of the Tears from the Eye into the Nose. You recollect by Anatomy here, that the Tears are separate from a Gland above the outer Corner of the Eye, & discharged from a N.o of Duets within the Eye lids, so as to wash the Eye, then falling by their weight downwards, they are catched by the edge of the under Eye lid, & conducted by it as a gutter to the inner Corner of the Eye, which is lower than the outer, & here they are prevented from escaping by the Caruncula Lachrymalis, & kept applied to two small holes the Puncta Lachrymalis, from which Duets convey.d 1.m to the Lachrymal Sack, & from that to the Nose thro a Duct which opens under the Spongiosum Inferius, between that Bone & the place which divides the Nose from

the

the Mouth. Now Experience shows that a stoppage of the Tears happens frequently between the Sack & the nose, very seldom between the Eye & the Sack, you conceive y. a Stoppage will be more frequent passages from the acrimony of the Tears, for it is vain to say that Nature fits the Ducts for the Liquors, they are conveyed as she brings into her assistance Mucous organs to defend them, & we find that the membrane of the Nose is readily obstructed in the Coryza, when the Tears trickle over the face. The Causes w.ch naturally produce stoppage here, hinders a Disease from healing hastily, the acrid liquor prevents their healing, especially as the membrane is confined within the bone, & we cannot take off the Tension by applying Emollients, or expect relief by y.e opening of the sides. The Symptoms are these, the Patient at first sight is sensible of the Tears trickle over the face, the skin

about

about the Cornea of the Eye is red, he feels an uneasiness about the Cornea of the Eye, & he examines carefully he finds a degree of Swelling or distension of the Lachrymal Sack, & on pressure he finds y^e Liquor regurgitates thro' y^e Puncta Lachrymalia, at first resembling the Tears, but w^t a few streaks of Mucous matter at length the Colour changes, & in the end matter is observed mixed w^t y^e Tears, & the Puncta come to be inflamed & dilated, there is a Corrosion of the Teguments of the Nose, & a sensible fluctuation of Matter. The Skin is at length destroyed, & if a Probe be introduced the Bone is sometimes found Carious. & in a few rare Cases Spongy flesh grows out, particularly if the Disease has been preceded by the Lues Venerea, both the Lues Venerea & Cancer having a particular determination to the part, insomuch, that I've seen the Skin affected here in both these Diseases, & grow Cancerous, where there was no Disease in the Lachrymal Sack, as y^e part ought to be carefully examined, before we make

make a Prognosis, or perform an Operation.

Let us next see what Authors have proposed by Surgical means by relieving this Complaint, we endeavour hitherto palliate or Cure it by a general Antiphlogistic Course, but supposing that insufficient, what other Methods is y.e Surgeon to employ, I shall describe the different Methods, & to save time a few remarks upon them —

1.mo — They inject into the Sack some healing & Discussing liquors, w.ch they propose sh.d be done by a small Syringe, & a pipe adapted to the Punctum Lachrymale. Now admitting that some liquors may have a healing effect, may remove the Inflammation produced, as a weak Solution of Sacch. Saturn. are we under a necessity of Injecting these? I apprehend we are not, first such Injections are difficultly executed from the smallness of the Puncta, & they never fail to give very great Torture, the Eye being highly sensible, & by dilating the Puncta, we lessen their power

J

of performing their office of absorption, and the very use of them here is entirely overlooked, for we need only employ the Sacch: & pour the liquor between the Eyelids, & it enters as well as the Tears. So we would discard altogether y^e use of Injections in this manner. but next it has been proposed to throw the Injection upwards, & I showed you the possibility of entering a Probe into the Lachrymal Duct, but besides the difficulty attending it, just now mentioned, how is this to be done, if the Tears cannot be made to descend thro' the Duct? so both of these measures are out of the Question.

Next it has been proposed to break the obstructing matter w^h. Probes introduced at the Puncta Lachrymalia, & to open the passage; but there they entertain a very wrong Idea of the Disease. how do we discover that there are Substances in the passages y^e stop them? by seeing the Mucous mixed w^h. y^e Tears? and if we can push it in this manner, what is y^e use of Probes? and considering the Crooked

ness

crookedness of the Ducts, & the difficulty of passing such, while the thickening of the Membranes, wch are in an inflamed state occasions y. stoppage, we would reject such Instruments.

Next another Project has been brought upon the field in the French Memoirs, a flexible probe wth an Eye in it, like a common needle is introduced thro y. Eye foremost into y. Punctа Lachrymalia, brought into y. Lachrymal Sack, & from that into the nose, then we are to lay hold of it, & draw it out of the nose, & to pass a small Seton thro the Eye of the needle, then we draw the Probe up again followed by the Seton, the plain objection to this Method is the Extreme difficulty of executing it, & the stoppage of the Duct, that it is next to impossible to execute it, so this method is likewise to be laid aside. When mentioning the Injections sought to have taken notice of Injecting Smoke, they consider this a Disease where there is a great deal of Moisture, so they would dry the Membranes, as they would

would do a Ham by smoke, but really there is no kind of Ideas of the nature of the Disease comprehended in any attempts of this kind. The next attempt to this, as the Sack swells, we are to counteract the Swelling by pressure, we are to apply a compress, & you will find one pointed by Sharp, a bit of Iron is applied to the part upon a Common Compress, & fixed into its place by a Circular round the head &c. and such Instruments may in a few Cases be of some use, yet by merely resisting y^e distension they can have no effect, their only use is to prevent the very sharp liquor, the Tears from entering & irritating the Sack, or having first washed the Sack w^th Saccharum Saturni powdered into the Eye, we keep the sides is Contiguous by such an Instrument.

But supposing this Method to fail, it remains to give an outlet to the matter of the Sack by an Incission, & imy after that some Ancients, some Moderns following, have applied the hot Iron to destroy Carious bones,

and

and to this view the Moderns would have added
to make a passage to the Tears, but you will find
in Mr. Sharp sufficient reason for laying aside
these Instruments, as we can answer ye purpose
by others, wch are much better, so we make an
Incision on the Sack, the Surgeon looks for the
passage down into the Nose, & tries to pass a
probe into it, or some have proposed a stilon.
But if he does not discover the natural passage
open, he proceeds to make an artificial one,
such as described by Sharp, a pair of Iron crooks
is thrust into the Os unguis, & twisted
sideways to break a great hole, but this breakes
instead of perforates, & destroys much more
than is necessary, & notwithstanding this seems
to be the Vein, you will not find ye Sharp to his
pains to preserve ye opening after it is made,
so I would rather do the Operation as was
performed proposed by my Father in a genl way, wch.
a small Trocar we perforate ye Unguis,
then preserve the passage made by probes
& Injections, we introduce a Leaden Probe thro
the

the Canula of the Trocar into the Nose, wch we
keep there till the part becomes Callous, nor is
it necessary to withdraw ye Probe, & to throw in
Injections, the probe rendering the part Callous,
if you apprehend ye Lead may injure the
Bone by its hardness, we may use a Common
Bougie, or another soft Material. tho' in one
Patient who happened to go into ye Country,
& not to return as soon as he expected, ye Probe
was left in the passage 9 Months without
any bad consequences, & it was rendered perfectly
Callous. Some have proposed to introduce a
pipe of Silver to allow the flesh to close over
it, but this is not necessary, for the tears keep
the passage Callous, & keep up the opening,
besides such a substance left might occasion Disorder, might work its way outwards
or inwards, & fall into the Cavity of the Nose.

Now these are the general directions, &
upon the whole I would advise simply as fol-
lows. We attempt in the slightest stage of
the Disease to wash the Sack &c. an Eyelevation
proved

poured into the Eye, as a weak Solution of Sacch. Saturni q.s. to q.v. of Rose water, the Patient is laid in Bed on his back, & a Tea spoonful of it poured into the Eye, or he fills a quill with it, clasps his finger upon the end of it till he is above the Eye, & then removing the finger it runs into it, & he may continue in this posture five or ten minutes, till he feals a little glow about the corner of the Eye, then he presses back the Injection, and hinders the tears from entering by a moderate Compression, & in this way we may prevent the natural progress of the Disease for a No. of Years. But either suppose that the Matter has made an opening, or y. the Surgeon finds a distension, he makes the Incision w. a common scalpel suited to the part. now we can without much difficulty determine the place, we feel for y. Tendon of the Orbicularis Muscle, which is connected to the top of the Lachrymal Sack, & we give a free opening to the skin for admitting Instruments & y. y. wound may heal slowly

slowly, so we begin higher than the Tendon, & bring the Incision down a finger breadth & more, following the course of y. Duct, as nearly as we can, and as y. Puncta Lachrymalia are at the same time dilated, the Surgeon may if he chooses introduce a probe into the Puncta, we are not under a necessity of cuting a Tendon of y. Orbicularis Muscle, but I know from experience that the cutting of it is not attended to any deformity, the Cicatrix excepted, there is no retraction, the parts being fixed to the Bone. So with a Concave edged knife we divide y. Tendon of the Orbicularis, & lay open the sack y. whole way. Imd.y after making y. Incision Surgeons take a common probe, & try to pass it into the Nose, & they should attend to the direction of the passage downwards, outwards, & backwards, they may imagine that it is impervious, when it is not, if they find no passage, they imd.y proceed to make an artificial one, but tho no passage can be found at first, in the space of a few days when the Inflam.n has subsided & for by turning the point too much inwards

subsided, a common Probe may be made to enter, & no further operation be necessary, only we prevent the lips of the wound from closing by introducing a defsil of Lint, w. a thread put round it, but suppose next that we have waited a week perhaps, & are not able to pass a Probe, an artificial opening is necessary. Now you recollect where that is to be done. The Lachrymal Duct is supported partly in the Nasal process of the Maxillary bone, partly on the Os unguis, which is outermost, in the Bone there is a ridge, to w. y. membrane of the Orbit is connected, so y. it makes the Boundary between the External & Internal part. Now the process of Maxillary bone is thick & hard, & if you go within the ridge of the unguis, the Tears may get between y. Membrane & the Eye ball, so we are confined to the outer part of the unguis. We take a proper Perforator, as large as y. Nasal duct & make the Perforation thro the Os unguis, then withdrawing the Perforator thro' the Canula, & introduce a Leaden probe, y.

leave

leave it in the Orifice the part becomes callous, only drawing it back a little, y. y. end of it may not rub against any substance. Where we can force the natural passage we begin with small probes, or we may introduce a soft substance, as a bit of Isinglass. Some have proposed Setons, they pass a Seton thro' a hollow Tube w. the head of a large Pin, they make a probe point to the Tube, & enter it down the passage, then laying hold of the Tube w. a pair of Forceps within the Nose, they pull it out, but this is not preferable to the Bougee.

A single thing remains to be added, Suppose we observe the Lachrymal Sack distending, & that the Mucous begins to be discoloured, as y. we have reason to expect a total obstruction of the Duct, & that it is confirmed on pressing the Punctа & Sack, we are not able to force the matter into the Nose, I have thought that we might save the pains & deformity of the Incision by passing a Trocar thro out the Tumour, cutting the

Sough

tough skin with the point of a lancet, & withdraw-
ing the Corporator, the Tears run out, & introduc-
ing the Probe, the Tears we seek for the place,
make the perforation, & leave the Leaden probe
in the hole for a day or two, or perhaps 3 Tears
passing thro' would preserve the passage.

Notwithstanding this Operation, the
making an artificial passage, the advantage
of a Syphon is lost, & we w^d expect y^e Tears
w^d readily stop, & beyond doubt some of the
Tears generally run down the face, but we
are not to infer from this y^e the operation
serves only to let the air into the sack, &
to occasion the glewing together of its sides,
for I've known the Tears pass tolerably
well, but as a small share of them do run
along the face, a little fat may be rubbed on
the skin, to prevent it from being fretted.

We shall next return to the Operation pro-
per to be done on the Organs of Generation
in both Sexes. ——

Lect^r

Lecture 100th.

Suppose that there is an Incontinency of Urine in either Sex, & y. if Meds we have given had failed in their Effect, & y. a relaxation of y. Sphincter of y. Bladder seems to be y. reason, we are under the necessity of Mechanically stopping the Discharge, & in the Male instead of Bandage round the Penis, we use an Instrum.t called the Jugum Penis, I have caused this to be made of one piece, w.ch opens by its Elasticity, I use a Screw for bringing it to the proper situation, I once thought of another Screw to press directly upon the Urethra, but I find that it is unnecessary, if the same Complaint occurs in Women, one of the best Contrivances is recommended to us by Heister, I mean a Ring, such as is employed for the Prolapsus Uteri, only we must bring it lower, so as to press upon the Urethra. We stretch the part by it, & if we wish to give a pressure at a particular

place

place, we fasten to the Ringable Sponge, wch we introduce dry.

Next suppose the Contrary, y. y. Patt cannot discharge his Urine, after attempting relief by letting blood, fomentations, the warm Bath &c. the Surgeon endeavours to draw the water off by a Catheter, the use of wch in the Male is already known to you, we introduce it in like manner as the Sound or the Staff in the Female we use a Catheter streight or nearly so, for it will be better to use them gently bended, for tho' when the Bladder is emply, y Urethra can be brought into a streight line, yet when it is distended, the Urethra is some what crooked. I shewed you formerly y. method of Sounding or introducing a Catheter in Women, now they are generally made w. a No of small holes, as being least in danger of hurting the person, but you should be provided with others, wch have a large opening at one side, for I have repeatedly seen, in tallowy Cases particularly, such a quantity of slime

lime in the Bladder if it could not pass thro the small holes, but supposing neat that the Surgeon finds it impracticable to introduce this Instrument, he is neat under a necessity of puncturing the Bladder, & the only difficulty is, to determine the proper place. I formerly shewed that it was possible and easy to make a puncture into y. Bladder, at the very place where we begin to make the Incision for the Lateral operation, and where in Souberie's method, we finish y. Incision that is near to the neck of the Bladder, or at the lower part of it. I prefer this to other Methods w.h have been proposed. The most common was to introduce the staff as far as possible in the Urethra, suppose near to the neck of the Bladder, then the Surgeon cuts in upon the Staff, as if he was going to perform the Lateral operation, but now instead of using a gorget, Heister (advises) to take a Trocar, & follow as nearly as we can y. natural passage. Now in the attempt we cannot possibly

possibly follow the urethra exactly but cut & tear it, & with it the prostate gland & Vesiculæ Seminales, & we thus tear & cut the very part which is in a diseased state, so this method has been laid aside by Sharp &c. who makes an Incision above the Os Pubis thro the Skin, then the Trocar is passed. Now there is no difficulty in entering the Instrument, & if we keep the Canula within the Bladder, we may by pushing it too far press against & back of the Bladder & Intestinum Rectum, so Sharp gives a case where the Canula wrought into the Rectum (Bladder sic). If again it is too short & Bladder slips off from the end of it, or if no Canula is used the Urine gets into the Cellular Substance, but if instead of this we make a puncture on the outside of the Prostate Gland, we are sure of hitting the Bladder with as much safety as above the Os Pubes, & we have the advantage that the Urine (the) thro' no thing is done to prevent, does not ooze into the Cellular Substance, & if we leave a Canula

4 But when you have drawn off the Water the Bladder slips

Canula we readily fix into its place, & y. Urine runs thro the Canula as y. as it gets into y. Bladder, & we may preserve it here for several days together, till y. Inflammation at y. neck of the Bladder by the continued use of the Remedies has subsided. We need a Lancet or common Scalpel to cut a hole in the Skin, & the Trocar with its Canula & a flexible Catheter, w.ch is an improvement on the common one, it is made by twisting a bit of wire, & covering it with Linen spread with Plaister, & as if you were going to make a common Bougee, & that can remain in the Bladder with much greater safety to the Patient, in entering y. Trocar to prevent any mistake, we may introduce a Catheter into the Urethra as far as y. Neck of the Bladder, & we pass the Trocar at the breadth of a finger or so from the side of it, pushing upwards & a little forwards, till we are sensible from the want of resistance that we are within the Cavity of the Bladder, & taking away the Canula, we

leave

leave the soft or flexible Catheter, & support a Bandage with a Circular round the Pelvis, & we allow that to remain till perhaps by stopping the end of it, & collecting the water within the Bladder, we find y. the Patient can pass it in the natural way.

Next suppose the same Compl. in Women, & y. we cannot even in them draw off y. water by the Catheter, which you are sensible will happen less frequently, from y. greater wideness & shortness of the Passage, & that want of the prostate Gland w. mechanically presses upon the neck of the Bladder; you recollect the manner of introducing the Catheter in the Female, under the Clitoris, between y. Nymphæ, & if you are not allowed to use y. Urethra, you prevent the Instrument from entering the Vagina by applying the fore finger.

Next you discern the Bladder, & there are the same reasons as in the Male, for avoiding to puncture above the Os Pubis, and here the reasons are still stronger for

punct.

puncturing it in another place, so we can only do the Lateral ~~Operation~~ puncture, by passing the Instrument at the side of the Vagina, and within the bones of the Pubis, but there is still a better method, to puncture it from y^e Vagina, for not only the whole Urethra, but a large part of the bottom of the Bladder is intimately connected w^th. y^e Vagina, so we can puncture, or cut from it into the Cavity of the Bladder with certainty, we take a Trocar of the common length, or we may have one for the purpose, we make the perforation in a slanting direction, puncturing the membrane of the Vagina first, & running the Instrument first up betwen it & the membrane of y^e Bladder, as having got into the Bladder, we can as before withdraw the Trocar, enter a flexible Bougie thro' the Canula, & leave it in y^e Bladder.

Now after having shown how y^e Bladder pushes down in the Female, you'll observe that the same thing happens in the Male, only you do not see from the situation of parts

parts, so this is to be well attended to, because from it we determine the seat of the Disease when the Bladder is distended. I find that in a full grown person I can pass the finger higher the prostate glands, wch I've repeatedly found more irregular & harder upon the one side than upon the other, or in a scirrhous state, & therefore if a Tumour forms about the bottom of the Abdomen, with reg. to wch Surgeons may be divided, we can determine the place by applying one hand above the os Pubis, & the other within the Rectum, when we will find that the general pyramidal form of the Bladder, & be able to make the pressure of the one hand affect the other, & when the Urine is passed with difficulty, & retained in the Bladder the coats are apt to grow thick, & contract adhesions to the neighbouring parts, hence the Patient is able only to discharge a few ounces of water, yet the Tumour appears very large, but from the loss of its Tone, that emptying

comes

comes at last to be merely a running over,
& I know that in such cases the operation of sound-
ing should be performed more early & frequently
than is commonly done, as it gives a great re-
lief especially in the beginning.

Next, suppose that there is a Stone in Women,
& we are under a necessity of taking it out by an
operation. If in Man notwithstanding that the
neck of the Bladder is surrounded by Prostate
Glands, & Ducts of ye Vesiculæ Seminales enter
this into the Urethra, we prefer the Latoral
to the high operation, we would do so still
more in Women, or we would prefer opening
the Bladder where the Urethra comes out of it
to the Incision made above the Os Pubis,
& the only point to be settled is w^t respect
to the Incision, the method of making it,
about that place, we may do ye Latoral
operation as in Men, with in the Crus
of the Clitoris, w^e represent the Crus of the
Penis, avoiding the Vagina, but tho
this is practicable, yet it is easier for Sur-
geons

Surgeons, & nearly the same thing to the Patient to begin the Incision at the very Extremity of the Urethra, when the Surgeon sees y. direction of the Cutting Instrument, & the only danger is in dividing the Neck of the Bladder, y wound in the Urethra healing up very readily, nor will the cutting the anterior part occasion Incontinence of Urine, the end of y Urethra in Mares has a true muscular power, but in Women the water is chiefly conjoined by the neck of the Bladder, so we ought slit open the Urethra, wch is in Women not more than 2 Inches in length, the only method is making the Incision from y Vagina, to wch Surgeons seems to have been led rather by accident. so we find in Hildanus that a Stone worked its way from the Bladder into the Vagina, & Gooch taking the hint, made such an Incision, & the Patient was cured in 3 weeks, yet I would not recommend this Operation for the urine may keep the Patient fistul-

ous

fistulous on account of the thinness of the membranes, & distill into the Vagina, wch would be a terrible accident, whereas at the side there is a thickness of fleshy parts to unite readily.

I would say nothing of the cruel method wch has been practised of forcing open the Urethra by blunt Gorgets, or the old Conductors the making a cut being much better, so I would confine our views to the division of the Urethra, we are directed to introduce a straight probe into the Urethra, made nearly the length of the Urethra in Women, then passing down a double edged Lancet, to pass along the Probe, the Forceps into y. Bladder. Now why cut both sides of the Urethra? it opens wide enough in Men when one side only is cut, so one cutting blade is quite sufficient, but I imagine the sharp Gorget is a better Instrument, it makes y. Incision wth. equal ease, & by means of the Gorget, we readily conduct the Forceps into the cavity of the Bladder, so with this Instrument con-

= cluded

conducted w^th. any common Staff, or w^th. the Inst^t. used for making the Incision in abscesses, or w^th. a large one that the hand may be more out of the way, & holding the Staff tollerably we are in no danger of cutting y^e. Vagina. I may use the blunt Gorget along with the sharp one that I may do no mischief with the sharp one, & we may put out of the question all together the knife of Fowe (comb the sharp Gorget answering much better, cutting a side wises, & w^n. it the Surgeon knows when the neck of the Bladder is divided, & immediately stops, when he is sensible of a want of resistance). Now to finish the Operations proper to the Female, I shall mention a few things w^ch. respect to the Cæsarean Operation. You recollect y^e. situation of the Uterus w^ch. respect to the Bladder, & the Rectum, that it is between them, & you'll remember that the whole body of Uterus is covered by the Peritonæum, & in Pregnancy the same thing still is true. The Peritonæum

remains

remains over it, the Ligaments opening, and allowing of the gradual extension of the Uterus, so that they come to be much narrower in the last Months of Pregnancy.

When it be necessary to cut into the Uterus for the extraction of a Child, or to perform the Cæsarean Operation, the first is, to make an opening into the Cavity of the Abdomen, & the second is to go into the Cavity of the Uterus. Now if a Woman dies suddenly in an accidental way, we endeavour to save the Child by making the Incision as quick as possible, but suppose that the Child can't be delivered, & that from some straitness of the natural passages, before you undertake the Operation, you ought most carefully to attend to the Cause, & if the Woman ever had a Child at the full time, the operation is not necessary, because tho' the Delivery may be necessary to save her life, it is better to force the Os Uteri, than to undertake the Operation, wch is highly dangerous, & we have been led to respect to it by single

successful

successful cases. It has been performed here 5 times, and in several of the cases the Patients were in their ordinary state of health, & every one of them died, so we are not to undertake it without absolute necessity, & it is not necessary if you find the person of a moderate size, & tolerably well made, sometimes the deformity is confined to the Pelvis, but that is very rare, & the presumption is that the fault is in the soft parts, & the Oper. has been done when this last really was the case, so we ought to examine the general size & shape of the Pelvis, introducing the finger into the Vagina & Intestinum Rectum. Now suppose this matter ascertained, & that we are about to perform the Operation it is necessary first to empty the Rectum, & still more the Bladder. In doing the Operation Surgeons are not aware of the whole danger, they conceive it to consist in the nature of the parts divided, whereas it is very much owing to y. admission of the air

air into the Cavity of the abdomen, & especially if Blood remains in the Cavity, so we should go on with the Operation very cautiously. The place is tollerably well chosen, it may lie between the recti Muscles tho' perhaps it is better to go on the outside of the recti, & we do not cut thro' y^e recti, on acount of the Trunk of the Epigastric artery, we choose the left side if the Surgeon is right handed. We first make the Incision thro' the Teguments & Muscles, & lay the Peritonæum in view, & then we stop the blooding vessels, & if a large artery springs, we take it up, then we cut the Peritonæum, w^ch is to be done with Caution, for tho' generally the Uterus is Contiguous, yet some turn of the Intestine may have got between, so we should make a small hole, & slit it open very cautiously, then we should press down the Peritonæum to the Uterus, to prevent the air getting into the abdomen, & in cutting into the Uterus we hurt the middle of it, where the vessels are small,

and

and tho' the vessels of the Gravid uterus are very big, they do not pour out so much blood as might be expected, we then divide the membranes of the child, & take it out with the Placenta. There is one step more to be taken in introducing the hand into the wound of the uterus, viz. the finger to open the Os uteri, to allow of blood naturally discharging, as well as that which comes from the wound to pass downwards by the Vagina. We next endeavour to close the wound. I am not certain whether we ought to make a slight stitch in the uterus itself, drawing the sides moderately together, & bringing the Threads out at the Tegaments, having let all out that comes readily, we shut the wound in the abdomen, making the stitches near to each other, which I find have effect in saving the lives of animals, but if we apprehend that Blood will be discharged, we leave the bottom of the wound open, only covered with a thick

Com-

compress to prevent the air from entering, & we continue the Antiphlogistic method during the Cure.

As I have spoke fully formerly of y^e treatment of the Venereal Disease, I need not repeat what I have said in respect to Injections, nor is it worth while to show you the common Instrt. for making them, but from the uncertainty of their effect we ought at least to be carefull to prevent the matter from being pushed backwards in the Urethra, as a Swelling of the Testicle is frequently occasioned by the use of such Injections. Next suppose y^e the matter is translated to the Groin, & a Bubo formed, I would observe y^t if the Bubaes were more left to Nature, the Cure would go well on & the Incisions Surgions make, are at least often unnecessary, & still more the cutting out considerable portions of the Skin.

Next there is often a doubling of the Skin of the Penis, the Prepuce often suffers, as

as in Venereal Cases &c there is a Sebaceous matter spread around the circumference of y Glans, w.ch becomes acrid, & inflames the part, and a wash of Sach. Saturni is of use in removing the Complaint, but especially from the Venereal Disease the Prepuce grows thick & is tighted on the Glans, that it swells, & hinders the Urine to be passed w. ease, the Complaint is called Phymosis, & here the only difference is in the situation of the skin, sometimes at birth y. skin is found to be straitened in that manner, especially before the Glans, now take the most simple Case, suppose y. straitening natural, what kind of Operation is necessary? You find the practice recommended in Religion, or Superstition, introduced from the false Jews, if any part could be hurtful to us, we are directed to draw forwards the doubled skin, & to cut off a Circular portion of it, but it is difficult to perceive the necessity of this

* if the straightning is before the Glans almond

almost in every case, as it is evident that sliting open the side will answer all the purpose the skin is tightened only at the anterior part, there is the tightness of a bridle at one place, & cutting that circle the whole becomes looser, as want of reflexion has led to advise the complete circumcision. After dividing the side you may draw back the skin, & keep the straitened portions asunder, that the void may be filled up to of new flesh, which soon gets looseness so as to be moved at pleasure. Next suppose a Venereal cause, the same thing applies, the skin was formerly wide enough, & is now grown strait by the Disease, and supposing the common remedies to fail, I have sometimes seen the vein of the Penis opened in Imitation of Cowper, but this is dangerous on account of the Nerves, & has been proposed more from Theory than Experience of its Effects

20

so we would use Leeches, taking care that the Venereal matter does not touch them lest Venereal Chancres be produced, but suppose the common method of letting blood at the arm, the general Antiphlog. Method & the Injected Mercurial Ointments under y. Prepuce, as there are generally Chancres, & this seems to have some effect, perhaps any greasy substance would have y. same, but supposing that these fail, we slit open the side, some use a pair of Scissars, with a great deal of Torture, & at any rate the skin is too thick there to be cut easily with a pair of Scissars, it is better to take a very small furrowed probe, & introduce it between the Glans & Prepuce, & cut upon it, or we introduce a plate of Metal, as of Silver, & cut upon it, or we may introduce a small Tube between the Glans & skin, then pass A thro' the skin, and drawing it forwards we make the Incision, & we ought to draw back the skin till we find resistance, only pulling

A through it a knife &c we push

pulleng it forwards we make the Incision, & we ought first to draw back the skin till we find resistance, only pulleng it forwards when we have hold of the straitned part, we make a Cut on the side, avoideng the under part on account of the Frænum, & the upper on account of the large Veins. If the Prepuce is Cancerous, we cut it off, we slip in a thin Spatula betwen the Prepuce & y^e Glans, to stretch it, & make the Incision on the Spatula. If there is a Paraphymosis, the best method is to cut the doubled skin with a Lancet, making a number of Incisions where the Stricture is greatest, for the Ring straitenerg the Glans may even occasion a Mortification or Gangrain in the body of it. But suppose that the Penis is affected with Cancer, & to save the life of the Patient, there is neccessity of performing Amputation, my Father used long ago to alledge that the method of Ruysch, and Surgeons following him, was cruel and im-

improper, the making the part diseased drop off by a ligature, instead of making an incision, from the Idea, that as the Blood is discharged into the Cells, every Cell would pour its blood in considerable quantity. Now his Idea was just, that he should make the amputation in the most ordinary manner, we first cut the Skin, & drawing it back, we divide the Cavern.s substance of the Penis, & as the Bleeding is so inconsiderable, that there is no necessity of stitching up the Trunks of the Arteries supplying the Corpora Cavernosa, we may use a bit of knitting, with a stitch like a Tourniquet in the time of the Operation, & if a principal Artery springs, to bring it out & tye it. & if the Urethra is in danger of Contracting, we introduce a bit of Silver pipe, or Soft kind of Canula during the Cure.

Lect. 41st

Lecture 101st

The treatment of one complaints of the Urethra remains, wch is commonly the consequence of Gonorrhœa. I have endeavoured to prove formerly that sometimes Ulcers within the Urethra, where they form on the outside of the Glans, & a Chancre is produced, & that is sometimes followed by a Verruca or Wart, & where Ulcers form on y. inner side, the consequence may be the same, several authors have denied this, but I've not only seen the Ulcers within the Urethra, but in consequence of them the Warty substance produced, but much more frequently the Gonorrhœa gives occasion to a straitening of the Urethra in particular places, & this will happen readily where there is a Gordee, wch is common in the Gonorrhœa, the Penis is then distended & erected with pain, & sometimes the hardness extends a considerable length, but

but at other times it is confined to a small spot, if it should cancel the swelling outwardly, a small swelling on the inner side may straiten the urethra. As to with respect to the Cause of the Virus, that the Lues Venerea has preceeded, yet they are no proof that the Disease is present, because we can't cure either certainly by a course of Mercury how ever long continued, & yet we conclude that Mercury erradicates the Venereal taint, or suppose Y. Y. Patient has in the beginning of the Disease taken the ordinary quantity of Mercury, but y Virus remain, he may allow them to remain without dreading a Venereal taint, at the same time we should endeavour to get rid of them by cutting them off, by destroying them with Caustick, or by the means of the Bulvis Sabina which without remarkable pain, has remarkable effect in destroying them.

Suppose next that there is merely a hardness or Stricture, nearly the same things may be observed, & here a principle remedy is

A or stricture they both plainly prove but especially the Venereal

is a Milk & Vegetable Diet, we may at ye same time rub on the parts Mercurial Ointment, or apply an emollient Poultice, & we endeavour to open the passage by the use of the Bougee, wch I believe that Mr Sharp acts here mechanically, & provided they are of a proper Consistence, the Materials are of little Consequence, if you except the Caustic substance. with this Instrument, for the proper use of wch I refer you to Sharp's Critical Enquiry, we enlarge the passage, we first use a small Bougee wch a small point, & gradually enlarge the size, working it in, & withdrawing it when it gives a considerable pain, at first perhaps the Patient may be able to bear it for half an hour, & tho' we should fail for 2 or 3 weeks the Cure may be compleated, & supposing the Materials are not of consequence, Bougees may be made of Leather Varnished, which enters more easily, & will & will a little when heated and moistened.

Next suppose that in consequence of an Ulcer within the Urethra, or a Vernal at ye root of the

A or stricture

alterating yl

the passage for the urine is first difficult, then there is an erosion of the coats of the urethra, & afterwards of Cavern.s Subs.ce of the Penis, & a fistula formed this appearance generally in the Perinæum, it is not very easy to account for that, but we observed it, & hence such opening are generally named Fistula Perinæa, by the erosion of urine gets out into the Cellular Substance, & as soon as it has got thro' the proper Coats of the Penis (which are so close & irritable that they Inflame & hinder to diffuse) within the Corpora Cavernosa, it soon makes its way thro' the Teguments, but I've seen repeated Instances where it spreads freely only in the Cellular Substance between the Skin & the Penis, & it does this very readily if it runs towards that part, and particularly the Scrotum wanting the fatty membrane, so that it is more loose and Vesicular, & the urine stagnating occasions violent Inflammations, Swelling and thickening of the parts, as I have seen the

the whole of the Scrotum swelled as big as both the fists, & as hard almost as a piece of Cartilage, with time the Skin is corroded, & perhaps y^e^ Corosion is in a N^o^ of places, so y^t^ we have a N^o^ of Fistulæ all proceeding from one hole in y^e^ Urethra, tho' in some Cases there may be more than one. Now suppose that Disease in its worst stage, sometimes the Urine by stagnating produces Calculous Concretions, & if we find Stones in the Scrotum, in what manner are we to treat the Complaint? I apprehend y^t^ y^e^ gen^l^ Views must be these, we endeavour to find out y^e^ place in the Urethra w^ch^ is eroded, before any Incision is made, Surgeons in this view commonly probe the Fistulæ, but mostly to little purpose, because when the Urine has got out from the Urethra, it runs on all sides, & finds passages that are as crooked as those formed in the ground by Rabbits. so we would rather use the Leather Bougee, w^ch^ is smooth, & w^ch^ has a sufficient firmness, or what answers still better, we inject liquors, or blow

blow in air, by which we can trace the Fistula exactly, we introduce a hollow Tube into the urethra, & see at what part the Injection passes,+ or we may try it in the reverse way, we may form the Cathedor of a piece of Silver Plate, bro^d round a Lovie, & made to touch, by w^ch it is quite flexible, & this adds to the firmness of the Leather, & does not lessen y^e flexibility. For this Injection we may use a Syringe, (or a Bottle of the Capoache) to fill it we square the sides together, & hold it in the water, & as by its Elasticity it comes to its shape again, the water fills it, it is made of the Juice of a Plant found in the East Indies, & in South America, it has very singular properties, there is scarcely a Liquor known that destroys it, so that you may keep Oil of Vitriol in it.

Having found the situation of the Fistula, in what manner are we to treat it? There is no Complaint w^ch gives more trouble to Surgeons, the first step is to give a free discharge of the matter of the Fistula from the urethra

+ into the Sinus

Urethra, that is, we divide the Skin freely, & as near as possible to the Fistula in the Urethra, next we indeavour to lessen or remove the Callus, which is chiefly to be done by the use of the Bougee, if possible we pass a Bougee beyond the Fistula, & once we have gotten a common Bougee to enter, we may assist the cure a good deal by a hollow Bougee, or Catheter, we may pass it beyond the Fistula, & when the Patient is about to make water, let him press upon the part of the Urethra, so as to hinder the water getting thro' the Fistula, & if that is practicable, we shall often succeed in making Cures, for I have seen Cures made after the stream of urine was tolerably free by means of the Bougee, but if still after the rendering the passage free we find it remains to make an Incision into the Urethra, we follow a Probe introduced at the External end into the Urethra, or we introduce a Staff into the Urethra, & taking a common direction, we pass it into the Fistula like it strikes the Staff, we then make the Incision as if you were going to the destruction of the Urethra

to perform the Operation of Lithotomy, only if the Passage is at a distance from the Bladder there is no occasion to go higher, but merely to make a free Incision w.th y.e Knife, then we may succeed by common Dressings, if the Incision is made in a part that is thinly covered, we are to join the lips of the wound together, as w.th y.e Hare Lip suture, & if we may not straiten y.e passage too much for the Urine, we may introduce a very small hollow Catheter past the wound, then make the Stitches over it, & allow it to remain for several days, which can be done, so y.t in one or other of these ways we can give relief to some Patients, & cure a great many.

We now go to the Diseases of the Spermatic Cord, and first to the

Hydrocele or Dropsical Swelling. Now of these there are various Species.

1.mo There is a diffused Dropsy under the skin communicating w.th y.e whole Cellular Substance of y.e Body. In this Case an Operation is only in the part from its depending Situation, for if we

we raise the Scrotum & make an opening in y^e^ part, we can discharge the water, & the manner of doing this will be considered in speaking of Anasarca in gen^l^.

Next there is a diff^t^ Dropsy in the Spermatic Cord, or water may be confined by y^e^ covering of y^e^ Cord without spreading at first into y^e^ neighbouring Cell^r^ Subst^ce^ Of this kind of Dropsy however there are scarcely above half a dozen Examples in the late Writers of Credit. We distinguish the Compl^t^ from y^e^ size & softness of the Cord, the want of a free fluctuation, & y^t^ it keeps nearly y^e^ same size and shape in different postures of y^e^ Body, whereby it is distinguished from the Varix of y^e^ Spermatic Vains, this too requires y^t^ y^e^ water be let out by Punctures and Incisions.

Next the Water may be confined in Natural Cysts, or in Cysts formed by Disease in every part of these Organs, even without the Tunica albuginea, tho' this is a rare Case.

Next there is a Hydrocele depending upon y^e^ Original situation of y^e^ Testicle, the processus remaining open, so if the Cav^y^ Labours under ascites

ascites, this will produce Hydrocele, or suppose the Hydrocele to throw out a vast quantity of water, it may be the cause of ascites, but this too is a very rare complaint, we distinguish it by the water passing to & fro, according to the situation of the Body.—

Next you may conceive Cysts to form shut bags without any communication depending perhaps on an irregular union of parts soon after birth, as if that process remains open in particular parts, shutting perhaps again below, & then again at the ring, or a Hernia may happen, the Peritoneum be pushed down, & if Sack remain straitened at the ring, shut there & leave a bag beneath, wh may come to fill w. water, tho' I can't produce an Instance of either of these, there is another kind wh does happen, a Bag grows from the Tunica Albuginea, or Epydidymis quite shut & containing water, or the water may come to fill up ye whole cavity of the Tunica ~~Albuginea~~ vaginalis, & yet on opening the Tumour, you do not find the testicle

Testicle within the bag. Two species alone remain, the one of these by far the most common occurring in 99 Cases of 100 is the distension of y^e Vaginal coat; where the water Collects in it, the other has been denied by some authors, as M^r Sharp, but without reason, for I've seen more than 6 Examples of it, a preternatural encysted Dropsy of the Spermatic Cord, a large bag filled w^th water, the bag perfectly shut, & requiring the same kind of Treatment, as where the water is contained in the Vaginal coat, so we would chiefly attend to these two Species, or if any of the other occurs, if we know the treatment of these two, we apply it to them.

Now first by what marks do we distinguish the most Common Hydrocele, y^e of y^e Vaginal Coat. 1^st. It always begins to increase very slowly, tho' sometimes an accident gives occasion to a more sudden Dilatation. It is filled with pure water, & does not give much pain to the Pat^t. after it acquires such a bulk as to produce uneasiness, we find y^e Testicle is con-

cealed

concealed by the water every where excepting where the Spermatic Cord enters it, it is a large body at the upper & back part, so y. we can feel y. Testicle at y. part & y. Finger. We know next y. Disease by Palludidity, wch is gen.y to be observed, that this mark is not to be dependedon, as y. water may be bloody, besides Hernia of the Intestines are concurred, are transparent, but we here feel y. fluctuation of the liquor, & we perceive y. Spermatic Cord unchanged between y. Testicle & the ring of the Muscles, & this posture & situation of y. body does not alter the Tumour, whereas in whatever manner the Hernia may have begun, the Tumour alters the situation according to the posture, & we can in general replace it in some measure with the hand, we are sensible of air, & we feel the Tumour running up into the Belly. The other kind is distinguished by our feeling the Testicle distinctly quite round generally under the Tumour, not always, for in some Cases the Swelling pushes down lower than the Testicle. This distinguishes it

it from the Hydrocele of the Vaginal Coat, and we distinguish it from Hernia by y^e^ marks mentioned, only y^e^ former reaches near to the ring.

Supposing now y^e^ nature of y^e^ Disease understood, here as in other Cases of Encysted Dropsy we can do little towards a Cure by Medicines, or External applications, yet sometimes from lucky Circumstances these succeed, or Nature without their assistance performs a Cure. Thus I have known 3 Instances where y^e^ operation was intended to be performed, but y^e^ Patient insisted for a delay, & tho' y^e^ Tumour was as large as a Goose's Egg, in a few Months it went away, but this happens so very rarely that there is little encouragement of making trial of such Medicines as may hurt the Constitution we may apply a weak Solution of Sal. Sal. mixed w^th^ Spirits of Vinegar, or give a gentle purgative, or more particularly a mercurial one, once a week or 10 days, & if this does not succeed we have recourse to Surgery, if y^e^ Constitution will admit of it, & at any rate if the Tumour

Tumour is grown to a great size we must of
necessity do the Operation. The cure is either Palli-
ative or Radical, we first have it in view merely
to draw off the water, & the method of doing it is
very simple, we need a common Lancet round
the Trocar, or rather a Lancet shaped w^ch enters
w^t. y^e almost ease, & by the narrowness you avoid
the vessels readily, we are also provided with
a Probe, the Patient is laid on his back, w^t. his
feet over the edge of the Bed, & a pillow placed
beneath the Scrotum, the next step is to stretch
the Tumour, by pressing w^t. my left hand upon
it. I make it as long as I can to increase the
distance between the lower part of y^e Testicle,
& y^e we may be in no danger of wounding it in
the Operation. Next I examine the Course of y^e
Vessels of the Scrotum, that I may avoid y^e
accident of the blood getting into the Sacks, w^t.
y^e Lancet I only make a slit in the Skin not bigger
than I was letting blood, if I don't use y^e Lancet,
the Skin is pressed in w^t. y^e Trocar, & it plunges
in all at once w^t. a sudden Violence. I now
lost

look within the orifice to see if no blood vessels pre-
sents, & taking the Trocar, & making a reason able
allowance for the thickness of the skin & back, I
lay the Instrument into the hollow of my hand,
& regulate the depth by my fore finger, & enter
the Instrument in a slanting direction, making
the hole upwards at a different place from the
Puncture of the skin, & from the oblique pas-
sage acting as a Valve there may be no oozing
of the water, nor the air get in when turning it
inwards. I know from the want of resistance
when I am within the cavity, when I draw back
the Perforator, pushing in the Canula, dur-
ing the discharge I make a pressure with my
hand on the back, which is material, for in a
common abscess the matter comes out first
pure, but towards the end bloody, the blood
pushing out from the Vessels when relaxed, so blood
may follow water here, as in other cases it follows
matter, we therefore support the part if we
find the whole of the water is not discharged
& that it does not run thro' the Pipe it may be

owing to the end of the Pipe pressing against the side of the Sack, or body of the Testicle, so we enter a Probe & push away the matter, & the whole may be discharged, then putting the finger on the part we withdraw the Canula, & immdy apply a proper Bandage, as a compress of Flannel dipped in a Solution of Sacch. Saturn. wt. Spirits of Vinegar, we support this with the T Bandage, & confine the Patt. in bed 2 or 3 days at least, keeping him on a cooling Diet, whereby the Collection will be found not to return so soon as usual, the Coat contracting so as to resist greatly the further distension, whereas by neglecting the compresses, it readily fills again wt. water & blood, & an Inflam. coming on prevents the radical Cure from being done wt. tollerable safety.

But suppose next the your Patt. is willing to submit to a Radical Cure i.e. to such an Oper. as by its Consequences produces an Inflammation, adhesion of the Vaginal Coat to the body of the Testicle. What ought to be the gen. means the Surgeon

Surgeon employs, or manner of doing it. There are various projects for the purpose, some of w^ch it may be sufficient to mention in a very slight way. Some persons propose to throw in some irritating liquor, as Wine, or Spirit of wine to produce an Inflammation, or introduce a hard body, as the Canula of the Trocar, w^ch is to be left there as a Bougee, but the objection to these is that the Surgeon has not the manangement of the Inflammation afterwards in his power, the other methods proposed are y^e application of a Caustic, the making an Incision, or the introducing a Seton, now first as reg^d to the application of a Caustic, there are two methods in w^ch it is to be done, the one is w^th the view of supplying the place of an Incision in a timerous person, hence it was applied nearly the whole length of the Tumour to make a free opening. of late years Mr. Else advised to apply it to the lower part of the Tumour of the bread th of Sixpence, which makes an Eschar double y^e diameter, and

and it lies on for a certain number of hours. Now tho' beyond doubt several Cures perhaps now a considerable Number have been performed in that way, I would prefer if other methods of the Incision or Seton, as being more certain, for in a Case we occurred in our Infirmary where that method has been practised, the Disease returned, & got at that place the Coats had been destroyed, & there was a complete adhesion of the external skin to the Tunica albuginea of the Testicle.

It only remains then to compare this method by Incision, & that by the Seton, now I must acknowledge I have not had a sufficient opportunity of seeing the Seton tried in a proper way, that is merely a Seton, for where we first make an Incision, & afterwards pass a Cord, we do the same as where we cut upon the whole sack, only to further trouble the Patient, but with respect to the Incision, the consequence of it has been extremely exaggerated.

Mr. Sharp gives the history of a few unsuccessful

unsuccessful which were treated in y^e^ manner 30 years ago, & w^ch^ are rather to be put down as uncommon, than as a Rule by w^ch^ we are to be guided. My Father has the Operation done 30 times, & have directed it in 20 more Cases, my Father alledged that none of the Patients were seemed to be in eminent danger, & the Cure did not fail in a single instance, & in every one Case where I had the direction of y^e^ Pat^t^. there was no degree of danger nor fever, nay I am convenced that taking the most favourable represent^n^ of the Seton by M^r^ Pott, I am doubtful whether in the Case of the Incision the Symptoms be as violent, & the Cure is more to be depended on, besides we see exactly y^e^ state of y^e^ Testicle, we are in no danger of running into a mistake, whereas we may pass a Seton where there is water indeed in the Vaginal Coat, but the Testicle is at the same time in a Scirrhous or Cancerous state. The method of y^e^ Incision is this, if the Hydrocele is small, & from the feel we can judge that the Testicle is in a sound

sound state, we would do the radical Oper.n at once, provided the Patient be convinced of the small chance he has any other way. But if the Pat.t thinks the letting out the water would do, we would do this & examine the state of the Testicle. In 2 or 3 months y.e water collects again, or if the swelling be large, I would not do the Radical Cure immediately, but would draw off the water, & do y.e radical Cure before it is collected again in y.e same quantity, the danger being in proportion to the size of the Sack. In this way we satisfy the Pat.t that there is no other method of Cure, and we know the state of y.e Testicle.

In performing the Operation we examine carefully the Veins under the skin, or the Vessels in general, avoiding any large vessel, we make an Incision, not the full length of the Tumour, leaving a certain pouch or bag at the bottom of y.e Testicle, so we begin with a common Scalpel at y.e top of the Tumour, & carry it down to the

same

same Instrument, or what will answer as well, I take a Common or large Lancet, & I have ready a furrowed Probe to be introduced, but if I can easily cut on my finger it is y^e best Conductor. Now suppose that this is done, whilst the water is running out I introduce the Probe, & lay open y^e rest of the bag &. y^e knife made straight, &. a Probe on y^e end of it, that I may not hurt the Epididimis at y^e top of the Testicle, if any large vessel bleeds, I take it up w^th y^e Needle, I then apply common Dressings slightly between the lips of the wound. The Operation is generally done in the fore part of the day, & if there is no bleeding, in y^e Evening I cause a Poultice made of Bread Milk & Oile to be applied, but if the vessels are relaxed them may promote the discharge, so I delay y^e poultice till next morning, & I continue a Poultice during the Cure, confining the Patient & cause him to observe the Antiphlogistic Cours, & if he is Plethoric I cause him to be bled. Now a strict attention to these Circumstances will divide the cellular substance avoid y^e blood vessells

now next I suppose y^e Cyst presents, I divide it w^th y^e same

renders the Case much more safe & easy than it has generally been represented, but suppose that with Bell we employ a Seton, there is an easier method of introducing it than that which he describes. Let us use Hilton's bent Trocar, or a flat Canula with a long blunt pointed perforator B within the Sack, we withdraw the perforator, & allowing y^e^ water to be discharged then we bring the Instrument to the upper end of the Tumour, where we are to perforate y^e^ Skin, holding it in that situation we cut upon it, & bring it out. Now in Hilton's way we tie y^e^ Seton to the end of the Perforator, & draw it back again, but it is just as easy to have a common Probe w^th^ y^e^ proper Seton, Bell makes his of Silk threads fit for sewing, but being an animal Substance, it rots sooner than Linen, we wax it well, then oil it, & enter it without further pain to the Patient, & taking hold of y^e^ Seton we withdraw the Canula, & leave it in y^e^ Sack. I would apply here as in the former Case, the Bandage, & confine the Part to y^e^ Horizontal posture, & absolute rest. Bell proposes after the

B You make the puncture in y^e^ Skin w^th^ a Lancet y^e^ y^e^ Tumour projects considerably a cautious Surgeon may

ten or eleven days to pull out the Threads, but I would rather allow the Seton to remain there till there is a Conversion in every place except where the Cord passes when we withdraw it.

Lecture 102d

After showing the method of operating in general in Hydrocele, if only circumstances further that need to be added is, that where the Water is collated in a large Bag or Bags in the Spermatic Cord, or in the case of preternatural Encysted Dropsy of the Cord there is more Caution to be used in passing the Instruments, or in making the Incisions, for the Cyst may be as readily behind as before the principal Spermatic vessels, or the Vas deferens, so we must take particular pains to discover y^e course of the Cord, by feeling with the hand & examining y^e parts by y^e clear Light of the Sun, or of y^e Candle in

in a dark room, but as the light renders y.
w.ll as the Cyst transparent (in a great
measure) we only get a kind of assistance from
examining Man.ly. having determined as
nearly as possible the situation of the Cord, we
make the Incision first thro the skin, then thro
the Cyst, avoiding especially the vas afferens.

The next Complaint I shall consider is the
Scirrhus of the Testicle, or the swelling of
w.hich is commonly named so. y.e Disease
is supposed to be of that nature w.n degenerates
into a Cancer, it is Sarcocele, but if y.e swelling
be occasioned by a Gonorrhea an absurd name
has ban introduced of Hernea Humorales,
the Testicle then swells first from a Gonorrhea,
the causes & manner of y.e swelling were former
ly explained.

Next Blows may produce a hardness w.ch
will begin in the part injured, whether it be
the Epeddymes or Testicle, & lastly y.e swelling
may begin from internal Causes, when the
swelling generally begins in the part mak-
ing

making the Secretion in the proper glandulous part, or body of the Testicle. Tho I have seen a true Scirrhus begin in the Epididymis. Now when the Swelling is produced from y^e^ Venereal Disease, even tho it does not subside in the ordinary time, yet the long continued use of Mercury generally completes the Cure, & it seldom terminates in Cancer, but if y^e^ Disease proceeds from a Blow, the Cure is much more uncertain, tho I've seen Cases of consid^le^ Swelling attended w^th^ pain, discussed by the long continued use of Mercury, even where the Cicuta had been tried for some Months w^th^ out any sensible effect. if it proceeds from an unknown Cause, i. e. that y^e^ Disease is of that kind w^ch^ naturally runs from Scirrhus to Cancer, if the Constitution be tollerably sound, & the Swelling moderate w^th^ little pain, and not very unequal on its surface, we make a trial for some time of such Medicines as have the effect of discussing Scirrhi, & many will try the Cicuta, perhaps for the

the most part to little purpose, but if the Swelling be considerable, or after making a moderate trial, we ought to have recourse to the Surgical Operation, the Testicles ought to be extirpated, & before proceeding to the Operation I would observe that there is a danger of mistaking in some cases a Hydrocele for a Scirrhus, and again in other cases a Scirrhus for a Hydrocele, especially if there be the Complication of Water contained in the Vaginal Coat, wch is a very common Consequence of it, if Scirrhus produces Hydrocele, water collects after the Scirrhus has continued for some time, for the most part we distinguish Hydrocele by the Symptoms mentioned at our meeting Yesterday, but in a few Cases of Sack, and the Teguments become very hard & unequal to the feel. I may here mention a very instructive Case wch occurred to me 3 years ago. Dr Cullen, Mr Wood & I were consulted, a Patient came from a distant part of the Country with a large Swelling of the Scrotum, the Testicle on

one

one side was supposed to be scirrhous, it was as large as the Fist, hard & unequal; on the other there was evidently a collection of water, but at the under & posterior part of the Tumour there was an Ulcer w^ch was supposed to be Cancerous, & w^ch affected the body of the Testicle itself. On examining the case with all possible Care, we were not able to draw a certain Conclusion w^t respect to the nature of the Case, but we agreed to treat it in this manner, if as the Ulcer might be owing to the very great size of the Swelling, & the little Care the Patient had taken of his Complaint, but had allowed that part to rub upon his Cloths, we should draw off the water by a Puncture, & the small Trocar, & examine the state of the Testicle, we found that it remained sound within the Sack, & y^t y^e Ulcerated part was at some distance from it, by taking off the pressure & confining the Patient very much to bed, y^e Ulcer healed of itself in about 10 days, we then proceeded to treat the other side, we hoped to

to find it likewise a Hydrocale, & agreed to proceed as if it were, & if the Testicle was scirrhus, we would extirpate it, we found a most unusual thickness of parts & an appearance of dark brown matter like Coffee & Blood extravasated mixed in water, & the Testicle sound, & the Cure was compleated without any bad accident in the space of 3 weeks, when the Incision was made on the other side, and that compleated much about the same time, so we may see the danger there may be of mistaking Hydrocale for Scirrhus of the Testicle. Now on the other hand Surgions are apt to trust the first appearance & feel of the Patient, they suppose a Hydrocale, & examine no farther, whereas there may be a Complication. wch may be discovered by a more acute examination, & distinguish the bulk of the Testicle enlarged hard & unequal & a much greater quantity of water is necessary to conceal the Scirrhus of the Testicle, than the sound Testicle. In joining these marks to the manner in wch the

Disease

Disease was produced, the pain attending ye weight of ye part, weighing the Tumour in the hand, we may be pretty certain as respect to ye state of the case, but the safest practice is to proceed in such Cases, as if we were to treat an Hydrocele, wch is attended to very little disadvantage, as the Incision in both Cases are to be made in ye same manner, only instead of at once employing ye Incision, you make it half the length, examining the Vaginal Coat, making a puncture in it, & finding a Scirrhus you compleate the Incision. Now as to the steps of ye Operr they are so simple that I do not think there ought to be any dispute about ye manner of operating, we make an Incision ye whole length of the Diseased part & higher since that we may be at full freedom to tie up the Cord, & the Vessels wch bleed after ye Scirrhus is removed. I need not say ye 4th Operr is not to be undertaken if the Spermatic Cord partakes of the Scirrhus beyond our reach, but I would not be averse to the performing the Operr, merely

merely because the Spermatic Cord was considerably enlarged, for in every enlargement of the Testicle there is a proportional enlargement of the Cord. Tho' therefore the hard Scirrhus state of the Cord attended with pain forbids the operation, yet if it is, or merely an appearance of enlargement of its Vessels, or perhaps slight diffusion of water into the Cells of the Interstices of the Vessels, we would perform the Operation. I suppose then first that I am certain of the case, I make the Incision into the Testicle, & finding it diseased, I make an Incision from the Ring downwards to the bottom, & in doing so there is no occasion to pinch up the Skin, which is very commonly done, I make the Incision as easily without that, and more exactly in the proper place, & there is not the smallest danger of cutting the Spermatic Vessels. Now it is unnecessary having done this, to fall to work dissecting the Skin from the Spermatic Cord, all we want is to be able to pass a Ligature

around

round the Cord. w^ch we do with a large Tread'd Needle, so we mean with it to make a Tourniquet in the line of the Operation, or if the Cord is not enlarged we mean to confine y^e blood after the Operation, & to render it unnecessary to take up the Vessels singly with Needles, & a large Ligature does not cut or injure the parts so much. In making y^e Ligature Heister speaks of leaving out the Nerve, meaning the Vas deferens, but I would propose that you should on purpose take it in, as there are considerable branches of the Spermatic Artery running along it, & it is not more sensible than the rest of the Cord. having tied up the Ligature w^ch a running knot, I incise the Chord transversely without separating the sides, first from the Cord, and from the Testicle, for the separation is perfectly easy afterwards, besides, it renders the Operation tedious, & the bleeding vessels are not distinctly seen, we make the Cut about ½ an Inch below the Ligature & by pushing

y^e

pushing the finger behind the Cord & Testicle, we turn it out of its Sack, the Cellular Substance is so loose that we might with the hand tear out the Testicle, but Lacerations & Contusion ought to be avoided as producing more violent Symptoms than follow the cutting the Cellular Substance, so we dissect the Testicle from the Skin, & here the Surgeon is much the better of his Assistant, holding the skin with one hand, while he holds it with the other, tho' even without help there is no particular difficulty in doing it, imdy after making the separation the Surgeon looks for bleeding Vessels, & takes them up as quick as possible, taking hold of them w. a Common Forceps he pulls them out, and ties a Ligature round them, for if he delays doing this the Patient faints, the blood clots in the Orifices, & in a few hours after the Dressings are applied breakes out again.

Next w. respect to the Cord, if it be small, the Ligature is to be left, & a running knot will keep it well enough, so that we need not

not ever after the knot, where the Patients have suffered pain, it was owing to the Cord being drawn with too much anxiety, & if Nerves being bruised, or the Ligature has been applied when the Spermatic was remarkably enlarged, when the Ligature might be improper, & it may be better to loosen it, and to give the Patient some Cordiac to make the Vessels bleed, & observing the bleeding Arteries, to draw them out singly with the Tenaculum, & tie them, & in a large Scirrhus here every branch comes to be as large as the natural Trunks are, you still however leave the Ligature for 2 or 3 days, that if any Artery shall not have been tied, or if any Ligature slips, we may use it again as a Tourniquet, but it is by no means necessary, with some to have recourse to a Machine for pressing the Spermatic Cord against the Os Pubis, in the Separation I have taken no notice of removing any part of the Skin, either in this Complaint, or in the Hydrocele, for now

however large the swelling be, if the skin is sound it is unnecessary to remove it, but if it is Diseased we remove the Diseased portion, beginning & ending in the angle, & cutting out a solution like an Orange. Then the Surgeon sets aside the lips of the Wound, & lays in lint to prevent the joining, and an abscess forming after a granulation is produced, we take less pains in laying in the lint, & as soon as the blood is stopped we should cover the lint with an Emollient Poultice, that is, in the evening or next Morning. The next Complaint I shall consider is called

Fistula Ani, by which is understood not exactly a Fistula, but any considerable abscess about the extremity of the Intestinum Rectum. It is very evid.t y.t y.e Cellular Subst.e surrounding the Rectum, & y.e Rectum itself are particularly disposed to Diseases from the nature of the Contents, & to the unequal distension to which these parts are exposed from costiveness &c. Next you will recollect that the

the Skin about this place is remarkably hard, the
cellular Substance within loose, & y^e quantity of
fat very considerable, & hence matter formed
spreads far from the looseness, & from y^e hardness
of the skin, getting out with difficulty, & if the
matter is allow'd to stagnate from the erect
posture of the Body, it falls down upon y^e side
of the Intestinum Rectum, & the Skin resisting
more than the fat, it may form a passage into
the Gut, so that part of the matter, or the whole
of it will be discharged by Stool. The matter
most readily forming on the outer side falls
in along the Gut, tho' it is stopped by the close
connection w^th the External Sphincter of y^e Anus
has with the Teguments, so it rests about the
top of the Sphincter. but where acrid matter
contained within the Gut forms the Complaint,
that falls down till it is stopped by the con-
traction of the Sphincter, & hence where erosions
are formed, you'll generally find them in 9
cases of 10 about ½ Inch from the verge of the
Anus, just a little above the inner or higher part

of

of the Sphincter Ani, as soon as Suppuration can be discovered in the Buttock at the side of the Anus by the pain, the hardness of the part, & the increase of pain on going to Stool, the Surgeon ought to examine carefully the Situation without, & to introduce a finger within the Rectum, & being satisfied of the place, he ought to make an Incision on it, tho' at a considerable depth within the skin, & yet the fluctuation can be discovered, & he is not to wait for a fluctuation, otherwise he may come too late, & the coats of the Gut be destroyed. If any known Disease has been the occasion of the Abscess, whilst the Surgeon begins his Operation, he applies the proper remedy, so if from a Venereal Complaint he must use Mercury.

Next let us suppose, upon Examining such an Abscess, we find y. y. matter has been lodged upon the coat of the Intestinum Rectum, & are we to comply with a general direction, to make the abscess or Fistula complete by perforating the coats of the Rectum, then cutting down the side of it, & laying the whole cavity in that manner

A that the inner part of it is laid bare

manner open: we are by no means to do so, but to be guided by circumstances. I suppose y. first Rule has crept in from a particular circumstance, y. if the matter has actually made its way into y. Rectum, & a Fistula is already formed, you will not easily cure it with such an operation. Now I apprehend that even Surgeons have tried to heal Abscesses, supposing y. there was no communication, when in reality there was one, from the difficulty of finding out the diseased part, & one must seek carefully sometimes, as the hole is not larger perhaps than a brown quill, but generally round, if we can discover a hardness, & the fleshy part of the finger sinks in at the middle of y. hardness, now we are not rashly to open the Gut, & we may complete the cure without doing so. Thus putting one finger into the abscess, and another into the Anus. I have found nothing between but the Coats, & yet cures were also tolerably well compleated.—

Next let us suppose that there is a hole in

in the Inside of the Intestinum Rectum, that there is a real Fistula, in what manner are we to perform the Cure?

We first determine the place of the hole, & we ought to make it a Rule, if, when a Probe is introduced into the abscess, we introduced the finger of the other hand into the Rectum, otherwise we may be led into the mistake of imagining y.e Fistula is of great length, when the Probe was pressed thro' a very short Fistula into the cavity of the Gut, & the Sinus extends a very great length, as to 5 or 6 Inches upwards towards the Os coccygis, it would be difficult to make the Cure, the Vessels come to lie of a very considerable size, yet if you make a free Incision below, & give a free discharge, provided y.e bad habit be corrected by Milk & Vegitable Diet, with the Cortex taken largely, a very deep Sinus will heal up, & if the Sinus is short, & the habit altogether good, the Cure may be made with great safety to the Patient, & great ease to the Surgeon. The method of operating ought to

to be very simple, nay you will often be called to cases that appear very Complex, & wch yet are very trifling, so you will find holes half round the Intestinum Rectum, & yet all coming from a single hole, we search for the extent of the Cavities by injecting into them water & oil, & we ought not only to make the Injection from the Sinuses into the Rectum, but in the reverse way, especially where the passages are oblique, & also Valves.

Suppose next that we have determined the nature of the Complaint, & that we have found it to be simple, the reputation wch Ward's Paste acquired is a proof that such will cure of themselves, where there is a free discharge. But suppose that the Complaint continues, and that there is a necessity of an operation, are we to imitate Le Dran & other Surgeons in cutting out the Diseased piece. They introduce a furrowed Probe into the Fistula, & slit it into the Gut, then they take a piece of silver, on account of its being very flexible, and making it very sharp in the point, they run

run it into the furrow of the Probe, till they get as high as the Fistula, then they push y^e^ point of the sharp probe higher than the furrowed one & bending the point, they bring it out at the Intestinum Rectum, receiving it upon the finger, & having now a hold of all y^e^ Diseased portions, they cut out the pipe with the knife, proceeding up on the supposition y^t^ y^e^ Fistula has become Callous, so will not granulate & heal, but Experience has explodedy^e^ opinion, & has shown that there is no necessity for cutting out the diseased portion, nor is it in many Cases practicable. So where there are holes on both sides of the Buttocks, and an Injection thrown into one, runs into the other, the whole Circumference must in that Case be cut away, so we must only think of a Method of slitting the Fistula, & of throwing the wound into the same Cavity w^th^ the Abscess or Fistula, as when exposed to the air & Dressings, the Callous substance granulates & fills up. Surgeons speak of

of such membranes sloughing off, but there is a granulation from the Surface without any observable separation of parts, so the membranes which have not many Vessels when exposed to the air are affected so much as to produce granulations of flesh freely. So, we must have seen this Operation frequently done by a simple Incision wch is recommended by Pott, in a very good Pamphlet on ye Subject, as he recommends a Concave edged Bistory with a blunt point. This is to be introduced into the Fistula, then into the Intestinum Rectum, defending the part with the hand, then the Surgeon endeavours to turn it out, & cuts thro' the part with it, but there is another, & perhaps a better Instrument recommended by Heister for this very purpose, the Probe Razor, you introduce it as the first pair to the Patient, & you have firm hold of it, and you can introduce the Blunt point much better than a knife thro the Fistula, as ye Probe is made flexible, so you readily pull it down

down & bring it out at the Anus, & that before you have brought in the knife, & thus you have a fer in hold of the Instrument, both ~~with~~ by the point and hilt, so can at one stroke make the operation, before the Patient is well aware that the operation is begun, it is finished. If the Disease runs high there is a Method I have caused to be practised, you take a Common Gorget, make it quite smooth & even like a Tube, & introduce it into the Rectum, defending the opposite side of the Rectum, you then take a Probe Pointed knife, introduce it into the Fistula, and you cut with safety & certainty, & the side of the Gut is put upon the Stretch, or we might introduce a bit of wood & cut upon it, but we should not proceed higher up than we can reach with our finger, i. e. about 3 Inches or so. Now after we have done such an operation a good deal depends upon the Dressing applied, they must neither be applied so hard as to irritate the parts, &

in

inflame them high hay, nor to stop the passage of the feces, nor must they be laid on so slightly as to allow the faculent matter to get between y Dressings & the Fistula, which would prevent y Granulation & filling up of the part, so they must reach the bottom of the wound, the Patient ought to be kept loose in the Belly with a little Lenitive Electuary, avoiding the Extremes of Costiveness & too great looseness by giving Opium, & if the Stomach will bear it, & the Constitution be relaxed, we give the Bark freely, w^ch disposes the part to heal. a Cure may be compleated in 4 or 5 weeks, but if the Fistula runs high we are not always able to promise success, but the Patient may die of the discharge, at the same time where the Discharge is very considerable, if there is a free opening beneath, the Patient may recover, but next consider the manmagement where the natural passages are shut, or improperly directed, there has been some few Instances where the lips have been found joined together, by

the

the Eye proving that a fistula can live without swallowing this, then there is the most simple Operation required merely by an Incision, & that Saliva may keep the Lips from joining together again. Next at the mouth of the Vagina naturally there is a membrane called Hymen, the appearance of it however varying much. Now in some few cases the Membrane is complete, & that when the Women comes to Menstruate, the menses are retained. If the cause is known, & cure is perfectly simple, we cut a circular piece, or it may be sufficient to divide it by a Crucial Incision, from 4 to 8 Oz of Blood have been retained from that cause.

Next the Nostrils either are shut up, or the Small Pox sometimes in Children occasion the close of them, when the Child is obliged to breath thro' his mouth. Here we first cut the opening, then introduce a Bougie to keep the sides from uniting again.

Next, suppose that the Anus is shut,

but

but the place evidently marked, here the case is perfectly simple, but in some few cases the Intestinum Rectum terminate in the Vesica Urinaria, or in a blind Sack, & there is no vestige of the anus, here we make an Incision as near the place as we can judge exactly in the middle, & pass a Trocar upwards with the os Coccygis, working it like a drill, & withdrawing the Canula from time to time to observe if there is any Meconium on the point of it, & as soon as we observe that, we withdraw the Trocar, introduce a Probe and continue the Incision upon it till the Meconium is discharged freely, and with a Sponge tent we may keep the parts open. — Next the Urethra in either Sex may be stopped, if the orifice is only covered with skin we cut it & introduced a Bougee, but if there is a wrong termination or Fistula after Delivery, a high degree of Inflammation & Mortification may be induced, & a part of the Urethra fall out, or suppose that in the Male the Urethra terminates with a and has no other direction

with the opening in the side of the Glans behind it, ~~the whole~~ part of the urine is discharged w.t difficulty, here by enlarging the opening, the urine might be discharged tollerably well, but such a direction is improper for the Semen, so in a grown person we might perforate the Glans with a Trocar lugging at the extremity, then introduce a piece of flexible Canula, or hollow flexible Catheter thro' the Glans into the urethra, stretching the Skin & Cellular Substance up on the Canula in order to promote the growth of flesh, so keeping the Canula in during the Cure

Lecture 103.

Treatment of Hernia — You all know y.e meaning of Hernia we may conceive it to be a protusion of the Bowels from their natural Cavities, but still remaining covered with the common ~~A~~ at the under

common Tegument they had with the natural laxity.
You likewise know y. y. Bowels of y. Abdomen
are chiefly tho' not solely subject to y. Disease,
& you can determine the place where Hernia will
most readily happen. Viz. where y. Teguments
resist the least, generally owing to the passage
of a cord
of Vessels, or of Nerves, wch. necessarily carry out
with them a loose Cellular Substance to allow
of their easy motion. They may therefore hap
pen at the upper part of the abdomen, the
abdominal Viscera may be pushed into the
Thorax, w. y. Asophagus, & Vena Cava & Aorta,
or into the Intestines of the Lumbar ing muscles,
or at the back part where the obturator
Vessels go out, but three Species are the most
common, the Hernia of the ring, of the ex
ternal oblique, what ought to be called the
annular Inguinal wch. y. epithet y. large vessels
of the Thigh pass out at the
opening behind the Tendon or Ligament
of Fallopius, & over wch. the Inguinal Glands
are situated. The 2. Species is y. Umbelical.
now of these three the anular Inguinal is
is
always for the most part in y. Tegument

is by much the most frequent. the next most frequent is the Crural or Femoral, for the umbilical is seldom observed in men, or in Women who have not had Children, but it sometimes forms during the Pregnancy the distended Uterus pushing up the Bowels, & straitening them at the top of y^e^ abdomen comparing the two Sexes, women are more subject to the Crural or Femoral hernia, on acount of the size of the round Ligaments of the Uterus, & from the length & looseness of the Tendon of the External Oblique, from the breadth of their Pelvis, perhaps these 3 kinds, but especially the Inguinal and Femoral happen more readily from the looseness of the Peritonæum at y^e^ bottom of the abdomen, whereas it is not covered closely by Tendinous matter, perhaps to allow free motion of the Vesica Urinaria, from which circumstance, as also from y^e^ depending Situation, here the Peritonæum yield more readily. To distinguish Hernia from

other

other Complaints, & particularly from Hydrocele by attending to the Cause, the suddenness of the appearance, the pain, the fulness of the Patient, wch if the Intestine is included, is different from that from water contained in the Sack of a Hydrocele, nay we feel the motion of the air, & often can hear it, if the Omentum is included, we distinguish from its inequalities & softness, the Tumour too is continued from the Openings in the Belly, & it is affected by a change of posture, & the Surgeon may perhaps have it in his power to reduce it, but if he cannot do so, & the part inflames, the Bowels comes to be affected, Vomiting is brought on, & the Patient is at the same time bound in the belly, the passage of the Faeces being interrupted, we can next readily conjecture the particular parts of the Bowels that will naturally form such Tumours, tho' none of the Abdominal Viscera are free from Diseases, as they are all supported by doublings of the Peritonæum, wch yields

and

suddenly, or are drawn out gradually, but for the most part the under part of the small Intestines, the Intestinum Ileum will be the subject of the Disease, not only being y^e lower most, but having the longest Mysentery

Next we would suppose the omentum may very probably be included, & if it should, it may carry with it the large arch of the Colon, & these parts from Experience are found to form the Tumor in Hernary but suppose the Disease to happen suddenly & y^e Surgeon is called, he ought to attempt the Reduction, without even waiting till he has let blood, or performed any other kind of Operation, for a delay of hours, or even minutes may bring on Inflammation, & render y^e reduction more difficult, so the first attempt is to put the Bowels back after lying the Pat in a proper posture, but if he finds a difficulty of doing so, he is to let blood freely, if the alimentary Canal when inflamed is found to require V. S. perhaps more than any other Organ

organs of the Body, the necessity of this will be still more evident, where it is not only inflamed, but mechanically dragged out of its place, and pressed upon, so we ought to let the blood with very great freedom, at the same time we put the body so as to bring on faintness to take off the tension of the part, i. e. to make the Patient sit erect, or stand, we open a large orifice in the Vein, drawing the blood as quick as possible, & loosing the ligature instantly, & when the Patient remains in the fainting fit, we attempt the reduction, if still we fail, besides the Bloodletting, we assist by proper fomentations, & by Injections thrown into the body, after the Surgeon is about to repeat the Operation, the posture of the Patient ought to be horizontal, the shoulders & Pelvis raised a little, so as to slacken the belly as much as possible. The Surgeon applies his hand then to the Tumour, & instead of making a gent. pressure, he attempts to reduce first what may have fallen out last, if still he fails, he

ought

ought to try next the effect of proper agitation, & the opening should be made at the highest part into the abdomen, when the weight of the bowels will have a considerable effect, nay may pull the part into the abdomen, when it is not in the power of the Surgeon to do this by pressing. Suppose that we still fail, we next before proceeding to the operation try y. fourth effect of Purgative Medicines, & of Injections or y any means that can produce an Intestine motion, wch has been found to succeed when all other attempts were to no purpose, so we would give a brisk purgative of Calomel & Jalap, & we assist Purgatives by Injections, & particularly the smoke of Tobacco has been recommended. Now tho' I've contrived an Instrument for the purpose, & have used it, yet I own y. I am not convinced that its effects are much greater than an effusion of Senna wch a few grains of Tart. Emet. dissolved in it, but as some are of a different opinion, I shall show an easy method of throwing it in, I take the

the common anatomical Syringe, & double stop-cock, & have caused to be made a Box of Iron for holding the Tobacco & a plate of Iron perforated to allow the smoke to go from it, now joining these, if I draw the Sucker of the Syringe, I fill the Syringe with smoke, then turning the stop-cock, & pushing down the Piston, the air goes out at the side, & it is conveyed by a flexible tube into the belly, & if we wish to heat the smoke still farther, & to make it stronger, we need only change the situation of the pieces, filling the Syringe to the Box, & now if I draw the Syringe, the air passes thro' the Tobacco into it, then turning the stop Cock, & pushing it out again, it passes thro' the Tobacco again before it gets to the pipe, & I can at pleasure throw it in in any quantity. one person manages the stop-cock, & another the Syringe, while a third confines the smoke within the gut, by a wet cloth put round it. an Ingenious Gentleman instead of the Syringe has made an apparatus with the Bellows meaning

to

to use these, both for giving Injections, and for blowing up the lungs for recovering drowned persons. Now the Syringe would answer very well likewise for that purpose, & in giving the Injection, you work in a more equal manner with it. Took such an Instrument as I had already made, he screws on the Box, w^ch no doubt is more handy, & makes it of Brass, the Box is likewise made with holes, but to an Improvement he had a perforated plate both at the top & bottom, whereby the Air passes equally thro' every part of the lighted Tobacco. It may be worth showing another Instrument here viz^t a Method by w^ch we can ourselves manage an Injection, & the Patient sits upon the Pipe, or we might do the same with the flexible pipe. –

I shall next suppose that this method likewise fails, we ought then to have recourse to an operation, by which we mean to take off the mechanical pressure, or Stricture upon the Bowels, made chiefly at the anal Gut from

from the abdomen, & next after doing so to replace them, & the operation beyond doubt ought not to be delayed so long as it is frequently. It is impossible however to determine the time that ought to intervene between the Disease forming & the operation, for that must vary according to the nature of the accident producing the Disease, the quantity & kind of Bowels that is protruded. If the Omentum comes down, that serves as a mechanical protrusion, tho' in a few Instances it may entangle the Intestine. Much depends upon the natural size of the rings, of openings, upon the age, the Constitution of the Patient, & the management of the case, but upon the whole if the attempt fail, & there are no Symptoms of Mortification, we ought to operate. I suspect that independent of the immediate effect of the part out of the Body, the distension of the Bowels within has very dangerous effect, as they come to lose their Tone, & a Mortification may begin higher than the place strangulated.

Next

Next suppose we are to procead to ye Operation I show you a case of Hernia th. ye mouth of the Sack open, the Spermatic Cord passed behind the Sack, wch is its common Situation, the Peritonæum is pushed, & our name of Rupture is improper, if we meant to express a burst-ing of the Peritonæum tho' that is a possible case. Next the Sack is a good deal thicker than the Peritonæum within, & in the Herniary Sack you see the Testicle included in its Vaginal Coat, but if the process reuniting the Testicle has not shut, then the Bowels are in a contact th. ye Testicle, & this has led some to imagine that the cause was rather a Disease of the Testicle than of the Bowels.

Let us now suppose the Operation necessary, & proceed to consider the several Steps, & I shall take the Inguinal Hernia for exam-ple, being by much the most common species.

We plaw the Pat. horizontally upon a Table th. a pillow under his Shoulders, & the Thighs raised by Assistants to slacken the parts

parts, & the Surgeon places himself between the Patients knees, he begins an Incision w.th y.e common Scalpel w.th the wooden handle, & he begins it about an Inch above the ring, in order to bring the Ring clearly into View, & continues y.e Incision to y.e bottom of the Hernia, cutting the skin only. Now in doing that there is no occasion of taking up the skin double, w.ch loses time, & does not lessen the pain, & the Incision is not so exactly in the place as you would wish to have it, after we divide the skin we proceed w.th y.e utmost Caution, for tho it often happens that the water is lodged in the herneary Sack, and gets between the Sack & the Bowels, this is not a common Event, & where there is water it is as frequently at the lowest part of the Sack, as behind the Bowels, w.ch being full of air, push forwards, so suppose if by cautious strokes I've divided the Cellular Substance, shunning any Vessels that may present, we are next directed by Surgeons to open the Sack in order to examine the state of the

Bowels

Bowels, Now if the Omentum is down with the Intestine, & there is a suspicion of entangling it, or if there is water in the Sack w^ch needs to be discharged the Step is necessary, but if the Case is recent, & there is no room to suspect this Circumstance, we ought to take off the Stricture about the Ring if possible without opening the Sack, & then to push back y^e Bowels, as the letting in the air in the Bowels, is the Circumstance of the greatest danger in the Operation, & the cutting the Tendon is in comparison of that of no consequence, & besides the Tendon, we cut another thing, which is of chief hindrance, the Constriction of y^e neck of the Sack, w^ch strangulates the Bowels more than the Tendon does, & is ¼ Inch thick perh^aps, & the opening not so large as to allow us to thrust in the point of the finger, so we are to attend to this, & by slow Scratches to cut thro' y^e Stricture, we then reduce the Bowels thro' the Sack, pushing 7^m back to the fingers alternately, & thus we save the

Patient

Patient a good deal of trouble. But suppose next we find it necessary to open the Sacks, we do it w. the same knife, & taking a pair of common Dissecting Forceps we pull out the Membrane a little, so as to get a hole made in it with safety, looking carefully that no part of the Bowel is drawn out, we thus make a very small hole w. will receive a common furrowed probe, or Director, we then raise the Sack upon the probe, & by pressing it against the Sack, we are absolutely certain y. none of the Bowels are included, & thus we enlarge the opening till we can thrust in the point of the finger, w. w. as a Conductor, I open it w. safety, the knife having a straight edge & a blunt point, w. is better than the concave edge, w. is in danger of allowing a part of y. Gut to slide over it, we thus open y. Sack its whole length, & lay the Intestine in full view.

The next step is to examine the state of the Intestine, & of the Omentum, & we ought not to cut the neck of the Sack or Ring,

cut

least the Intestine shall back into the Cavity of the abdomen, so we turn them over gently, anointing the finger with oil, & see if the Omentum be not twisted round the Gut, & that the several parts are in a proper state for being reduced. Next we are directed to divide the neck of the Sack & the Ring, now I consider the cutting the Tendon as a matter of no consequence, so I would make the division, but tho the Stricture is such by a general pressure we cannot reduce the Bowels, yet taking them piece meal it is possible, but last soon after the separation the Bowels may tumble again into the Sack, & would divide it & after the Sure is compleated, the firmness is much the same, whether we cut it or not, as from every part which is exposed to the air there is a granulation of flesh, so we would next dilate the Ring, pressing in the finger, & along with it the knife, & we would divid the Ring & Sack freely, & it is of no great consequence whe-

whether

whether you cut the Tendinous fibres transversely, or humour the stand, & at the same time we examine the Ring, as one side of it may have grown to the other, & there may be two passages in place of one, so in y^e Memoirs of the Academy of Sciences we are told of a case where the Gut descended on one side of a membrane, & was returned on the other. having replaced the Bowels, we make loose stitches, apply a thick compress & Bandage, we make the stitches in the Skin only, but so thick as to exclude the air from the top of the Sack where it is contiguous to y^e Abdomen, that the Inflammation may not run so high. I've seen several Instances, & many are described where y^e Sack adheres to the turns of the Intestines. Now where we suspect that to be the case, we ought not to cut directly in under y^e ring, but to open the Peritonæum above the Stricture, & bend a probe & pass it down thro' the ring, so as to get between y^e Sack & the Intestine, but sometimes the Bowel

and having got into y^e cavity of y^e Abdomen

adheres not to the Sack, but to one another & how if the adhesion be complete, we only take off the Stricture, when we have done all that prudence admits of, but if the adhesion is slight, we may make free w^th. the Sack, & separate the Guts from it, you may encroach upon the Sack, but you carefully avoid the Intestine, we next return the adhering Bowels into the Abdomen, as they are surely better within than without.

Next suppose that a Mortification occurs, how are we to treat it? if we are doubtful w^t. respect to the Mortification, have no sure symptoms of it from the colour of the Matter, & want of pain in that part &c. we should return the Intestines tho' they look somewhat of a darker colour than is natural, for in their proper place they may recover unexpected, whereas if they remain, it is almost certain Death, but if there are clear signs of Mortific^n, we quit the Pat^t. the very little chance

chance that remains, we have Instances where a portion of the Intestines has separated, and yet the Patient lived, nay, where the 2 parts joined together & formed their Function. In one case of this kind the Surgeon may endeavoured to retain an end in the wound to discharge the faeces by that in the ordinary manner, the other end has been sticking to the Ring, & the two had grown together, but suppose the Gut mortified in a small part, we join the ends together, or we do what is called

Gastroraphia. to show it I shall take out a part of the Intestine, or we may suppose y^e Bowel to have fallen out in consequence of a wound, & in that case we examine it carefully & see there is no holes in it, or that the parts are not entangled, & we endeavour to reduce it, pressing the parts which fell out into the Belly. But next suppose that there is a Wound in the Intestine, if that Wound is length ways Le Dran passes a but he afterwards y^e Patient passed the faeces in the ordinary manner

Number of needles & threads thro' twiss them together, & keeps the wounded part at the wound of the Abdomen. but this straitens the ~~gut~~ cavity of the gut, so that I would prefer the Glovers stitch. Suppose next that the Intestines are wounded transversely, several Surgeons have tortured their Brain here to very little purpose. Some (advise to put the Trachea of an animal within the gut, & so sew it, but the manner ought to be this, you take a common needle & thread, & enter it from the outer side of the under end (a) & enter it in like manner thro' the other end of the Gut, & bring it out again, & then you pass it within the under end again, and bring it out again, & making a few such stitches round the Gut, we do all that is in our power. Some Surgeons have proposed the use of pegs in sewing up the Abdomen, but a common Suture will answer the purpose better, but if a discharge of matter is expected, let us sew the upper end, and

(a) If you bring it out ~~at the end~~ near

intro-

introduce a bit of lossed lint into the under, which keeps out the air —

I shall add two or three words about the other Hernia, in the Hernia Congenita we avoid wounding the Testicle or the Spermatic Cord at the back of the Sack, as it is more in danger of coming in the way than in the common Case.

Next suppose that there is a Crucial Hernia, from the situation of it just where the Femoral Vessels are to be found, & where the Inguinal Glands are placed, we are in danger of mistaking the Disease for a Buboe, tho' if we attend to all Circumstances, there can be little danger of such a mistake, here we make the Incision as in the former Case an Inch above the place that makes the Strangulation or the Tendon, the steps are all the same here excepting that the Peritoneum is covered with a thin tendinous Aponeurosis from the Tendon of the External oblique over the Thigh, & some of the

the Inguinal Glands are placed here; so we divide a thin Tendon & avoid these Glands, but after the Sack is opened, the Incision is to be made as I have already directed, & if we use the knife with proper caution, there is not the least danger of wounding the Spermatic Cord, or Epigastric artery. Sharp desires us to avoid cutting inwards, that we may avoid cutting the Spermatic Cord, & says that if by cutting outwards we divide the Epigastric artery, we can lay hold of it w. a needle, but the artery is very large from the principal Trunk of the body. Le Dran again apprehending most danger from y. cutting artery, advises to cut inwards, now from y. situation of the parts there is not the smallest danger of cutting either, if instead of going inwards or outwards we cut up towards the Ambilicus, dividing the Tendon transversely, & using the knife like a saw. If we are to operate upon the Ambilicus, we make the

Open-

opening where we best can, only we must use caution, as the Bowels more frequently adhere here from the disorder forming slowly, now there is no occasion in a case of such importance to mind the situation of the Umbilical Vessels changed into Ligaments, but we cut where we have most room.

Lecture 104th

At last Meeting in treating of Hernia, I mentioned the agitation of the Body, that the Patient's body should be inverted, the head turned undermost, the Patient may be put on another's back, with the legs over the shoulders, with the face towards his back, & the body is not only to be kept for sometime in that situation, but an agitation may be made. I show you an Improvement on Potts knife for the Fistula ani, made by Mr. Dods Surgeon to Haslar Hospital, the point is rounded

rendered much more flexible, and being made of Silver, whereby the Surgeon can more readily turn it.

We now proceed to consider the Surgical treatment of Dropsy, & we shall first determine the seat of the water, it is found to be diffused in the Cellular Substance, & the Complaint is called Leucophlegmasia, a white Swelling distinguishing it from Inflammatory Tumours, or attending merely to the seat it is named properly Anasarca, & the name explains more commonly than Surgeons conceive of the Complaint. They imagine that the water is confined merely in the Cellular Substance under the Skin, whereas it has at the same time got in between all the Muscles, nay into the Cellular Subst^ce lying together the fibres of each Muscle, & we can even trace it to the common membranes of the Bowels, so in the abdomen it gets between the Muscles & their fibres, from that to the back of the Peritonæum, from that

that to the doubling of the Mesentery, in like manner in the Thorax it passes into the Interstices of the Muscular fibres, the Intercostals, & then into the Cellular Substance at the side of the Pleura, & from it into the Mediastinum. it is generly imagined likewise that the water fills the cavities which naturally conjoin'd the fat, but that is a mistake, at least we can't yet prove it. I formerly shewed that the Cellular Subst. & adipose Cells, or Follicles are totally distinct, that they have no communication, however Physicians in their practice have been led into the opinion from the circumstances of fat being generally consumed in Dropsical Persons. Now in several Dropsical Subjects, where the Disease had continued for sometime, I have found the adipose Follicles filled with their natural Contents, nor could I discover bags, such as the Gally Cells are, filled with water, nor have I been able to find that the place of fat comes afterwards to be occupied by the water, tho that it is a very possible

case

case, that is, if you make an opening into the Subcutaneous Cellular Substance as far as is yet known, you may discharge all the water in such Cases collected. Some calls this Species Leucophlegmasia, or Anasarca, or we join these names together, & we may add diffused. You next know that the water may be confined in many shut Cysts found in the body, and on recollection you readily determine the place of these, the principal ones are but few in Number, there is a shut Cyst between the Dura Mater, between the Spinal marrow & its sheath, so there is one Cyst over the whole surface of the Brain & of the Spinal Marrow, so that water is collected by a fault within the head may fall down into the Spinal marrow, & form Tumours at the bottom of it, or the Disease called Spina bifida may arise in this manner, tho' we in general observe a concretion of parts, whereby the communication is interrupted — Next I've shown that all the Ventricles of the Brain communicate with

(a) Arachnoid coat of the Brain & the same easily is continued from the Dura Mater

with each other, making one Cavity, but not w.
the Cysts & Cysts. I have described, or there may be
two Species of Encysted Dropsy in the head, an
External & Internal Hydrocephalus. Next the Coats
of the Eye form a Cyst, containing naturally the
aqueous humour, w.ch sometimes enlarges so as
to require an operation, then going lower into
the Thorax, we find the Cor~~tonaeum~~ Circumdium
& the two Pleura, & in the Abdomen one great Sack
called Peritonæum, & we add to it the Sack af-
terwards formed out of that one, w.ch incloses
the Testicle, the Vaginal Coat & in the Female
Ovarium is full of Cysts, & there may be Dropsy
in every one of these natural ones.

But besides these Cysts w.ch we observe by
Dissection, Disease produces others, so y. there
may be preternatural Cysts in every part of
the Body, as in the Spermatic Cord, Kidney,
under the Skin &c. or we may see that there
is the Diffused Dropsy, & the Encysted, which is
divided into the natural Encysted & y. Preterm.l
w.ch are the Seats of the Disease —

&c

Let us next review the general Cause of Dropsy, why it is produced, we would first say that there may be 3 Causes forming it, the first & most obvious is the bursting of the absorbing Vessels, wch naturally convey watery humour, & as we find in Later Examples of the Thoracic Duct having burst & Collections of Chyle made within the Thorax, so the small branches may be subject to the same accident, tho this will happen very rarely, & I know that wounded Lymphatic Vessels heal very readily. I have known in letting Blood, Lymphatic Veins opened, which discharged their liquor for some time, & afterwards healed up, nay I have known the Receptacle of the Chyle, the cut transversely, unite again, & Communication came to be compleat, but we may hold this in view as a possible Cause of Dropsy.

Next, if we are to speak in general terms, the Collection is either from an Increase of Exhallation, or that the Inhalation is diminished

diminished. Now let us reduce under y^e^ genl heads the circumstances w^ch^ can induce either of these Causes, & we shall find y^t^ they depend partly on the fluids, & partly on the solids. & that very often both are in fault; thus we find several Instances well attested when the flow of Urine has been interrupted, & Dropsy succeeded, & in this Case we conceive that ye whole Mass of Blood is overloaded with the watery Vehicle of the food, w^ch^ gets thro' y^e^ Exhalents into the Cavities, & on Dissection I have found the Interstices of the vessels of the Kidneys filled w^th^ a Sebaceous matter, where the pressure of the vessels must have prevented the free Secretion of the Urine. Now if we can prove that a Dropsy begins sometimes in that manner, & as the quantity of watery Vehicle passing by the Skin is in this Island nearly equal to what passes by the Kidney, a want of free perspiration may in other Cases induce the same Complaint, or take it in another View, we have instances of Dropsy following large Hemorrhages where some

y^e^

of the principal vessels are divided. To this we may join an Experim.t of Lower, he draws off the blood in large quantity, & furnishes the animal freely with thin broth, the vessels come to be filled up with the liquor, & swellings soon produced, or where there is a want of a sufficient quantity of the agglutinating part of the Blood to entangle the thinner parts, there comes to be an Effusion, or Dropsy may depend on the state of the Fluids, & many circumstances may be supposed to introduce such a state of the Mass of Blood. Next we can give very clear proofs, that the relaxation of the Solids may be a cause of Dropsy, because we find it succeed the weakness of the Solids however brought on. If a Person is struck with Palsy in any of the arms, it in a few hours becomes Dropsical, while the state of the fluids remain unchanged in the rest of the body, so we account for this from the relaxation, & this is in proof that Exhalation is not performed by inorganic powers, but

(by)

by a regular Organization of Vessels possessing the living & Muscular powers.

Next the Exhalation can be increased by a Mechanical pressure, as affects the Veins more than the Arteries, and I tie a Ligature round my arm, so that the blood forces into it in ye Arteries, but if its free return is prevented, the Vessels swells, & even the whole arm. Lower goes a step further, that the Swelling happens tho' you confine the pressure to the red veins only, which not owing to the absorption being prevented, for this is performed by the Lymphatic System, or the Inhalation is not diminished, but the Exhalation is increased, the blood returning with greater difficulty, the thinner are pushed off by the lateral exhaling branches.

In like manner we explain how a Scirrhus Liver does not always produce Dropsy, from the Matter being more or less diffused in the Interstices, & making the return of the blood more or less difficult, & we find that the Disease produces a Dropsy only in

in the Vessels which in the Course of Circulation pass thro it, or we don't find that a Swelling of a Liver occasions Dropsy in the lower Extremities, that is, it does not affect y. absorbent Vessels by its bulk, but the Circulating increasing the Exhalation. Now Schirrous Livers where will act in this manner, they affect y. Veins in the way a Ligature does applied in imitation of Lower's Experiment. Some have rashly denied this effect of the Ligature, because on tying a single Vein such a swelling does not happen, but on account of the free Communication there is betwixt the Veins in order to get the Experiment to succeed, we must take up the whole of them. Now as an increase of Exhalation may occasion y. Disease, this may proceed from a fault of the Blood, or from a fault of y.e arteries Circulating that Blood, or from Mechanal pressure, & I would include here even where the Scirrhous of a Bowel has effect —

Next Dropsy frequently depends on

on a want of the proper Inhalation, & you readily conceive this if you reflect a moment on the way the Inhalent System operates to convey its fluids. they may enter by the attraction of Capillary Tubes, but this does not serve to continue the motion, but the Muscular power of the Inhalent becomes necessary, wch may be weakened by a variety of Causes, as in Paralytic Cases, whilst the water passes off more readily by the Exhalents. 1st Next, if there is a mechanical obstacle to the return of the Liquor thro the Absorbents, Swelling will happen & on this principle we in some measure explain the Swellings that are observed in weakly persons to begin in the feet, the obstruction of a few Lymphatics does not happen to produce the Swelling, on account of the numerous communications, but I've seen repeatedly a large Swelling in the Limbs from Tumours of the Lymphatick Glands. I've known the whole arm swelled, & yet it was not more diseased than the other in any

1) it may be taken in more slowly by the inhalent

1) and when numerous Glands have been visibly diseased from the Breast & removed into the Axillary Glands

any other respect. Neat. Neighbouring parts may swell, a pressure on Lymphatics in their course, so in Ascites produced by a Scirrhus of liver, the first occasion is a swelling of the Belly, but not of the Lower Extremities. when y. water is accumulated to a certain degree in the Peritonæum, & the absorbent vessels are pressed against the back bone & the liquor returns in them with difficulty, the swelling of the feet takes place, tho' there is no natural Communication betwixt y. Cavity of the Peritonæum & the Cellular Substance of the feet. Now under these few general heads it is possible to reduce the Cause of Dropsy, the necessity of attending to them is evident, it shews that there is no gen.l Cure for the Disease, but that we must try the Medicines according to the Causes: whether the Relaxation, Scirrhus &c.

Next let us apply this in the Cure, & I believe you will generally find that the Effects of emptying the Dropsical Cysts is

more

more attended to by Physicians, than y. removg the Cause; & that they proceed by Genl Rules too much, without makeng proper Exceptions, so in the first kind of Dropsy, the Incysted, as in Asaites, when the feet swell, we are not to imagine that we have occasioned this by the posture of the Patient, but only that it is occasioned by the Cause of asaites, & shown itself in the feet in consequence of y. posture, it is wident therefore that Surgeons are in the wrong when they are afraid to indulge Patients in Exercise, wch is necessary to give the parts a chance of recovering their Tone, for tho the Disease shows its self when the Patient is erect, yet by countroaiting the Cause, using Exercise with freedom, and assistng by Mechanical operation, to prevent the great distension of the skin, alone particular place, we may perhaps remove the Disease. Next in all the kinds of Dropsy, & almost without exception, Physicians prescribe a dry Diet. Now tho

in

in many instances drinking may be very hurtful, & that in every instance the Tumor increases moves slowly, yet when it depends upon obstruction in the different Viscera, and so swelling of these acts mechanically on the Circulating System, that Rule is not to be adhered to, and viewing this Case as common we understand how persons drinking largely of Mineral waters have been cured of Dropsy, the water adding to the swelling, but acting at the same time to the Cause, so that in time the swellings gradually disappeared.

There is a 3d Circumstance which they also generally err in, they endeavour to find out the kind of Discharge which shall the most speedily evacuate the Dropsical Cyst, & Purgatives do this the most readily. Now tho' we are often under a necessity of having recourse to Purgatives, yet I apprehend I would use them in the last place, for suppose that you free a Patient of a Dropsical Tumour by this Course, upon desisting from

them

from the Cure, the Disease returns, this now being a natural opening of the body, so we would either open the Skin or the Kidneys, & Diaphoretic or Sudorific Medicines ought to be more insisted on. But suppose neat that every Circumstance is attended to, nitonly the Effect, but the Cause of the Disease, & that our Medicines have failed, & we are under the necessity of having recourse to a Surgical Operation of letting off the water. So I now proceed to shew the manner of doing that, & we shall begin with the Diffused Dropsy where the water is contained in the Cel. Subc. Generally Surgeons delay an Operation till the Skin is so much distended, as to be ready to burst. Now I am perswaded that we stile stand a better Chance of Curing the Patient if we make the Puncture more early, because the whole parts of the body by their distension lose their Tone. The operation its self is perfectly simple, some use a knife, & with it make a large Incision about the Foot or Ancles

ancles, I've seen them made 3 or 4 Inches in length, but it is not very easy for the Operator to account for their practice, they seem without any reflection to have transferred the Operation for the Cure of the Hydrocele, without considering the total difference of the Effect, as if we meant to cut open the whole Cellular Substance of the Body, but we are merely to let out the water, so that the Effect is the same whether the Incision be large or small & besides the pain, they are particularly dangerous, as from the drilling of the water the part inflames, & very readily mortifies, & I have even seen great deal of trouble when a bigger kind of Lancet was used, so that the Surgeon was well pleased to patch up the wound he had made, so we would proceed with great Caution in such Cases, & if the Distension is very considerable, we do not begin to make the Incision in the most depending part, that is in the foot or ancle, but we first perhaps begin in the Trunk itself, or near the

the top of the thigh, emptying what is above & then going lower, so there is real danger from the water all drilling thro one wound, & the Surgeon is apt to get much blame, as the prospect of cure is but small, he ought not to run such a hazard, especially as no advantage attends such openings. for if the first opening is too small, it is very easy to make new ones. so the Common Sandal makes an opening sufficiently large, we introd it under the skin & cut the cellular substance freely round, otherwise it stops up ye wound. having thus made punctures, by proper pressure & friction of the Body, & this also assist in making the skin recover its Tone, & serves to enable the absorbent vessels of doing their office, of taking in the fluids more freely, & with the same views we support the skin with proper Bandages, and instead of Linen we use Rollers of Flannel which by their Elasticity support ye parts, & take in more of the moisture, so that we endeavour to direct the water to the punctures

the skin is not nearly so much galled, & where the water runs out immediately from y. punc. wic, you defend the skin by some Greasy substance, at the same time after the first incision is taken off, we give the Medicines on which we place our confidence, but along with y. in the Case of Anasarca we give Vomits frequently, wc. gives a general stimulus to the parts, & enables them to recover their Tone, & mechanically push the water from the Cellular substance of the Bowels in wc. it is apt to stagnate, & we ought likewise not to confine the Bandages to the extremities, but also to take in the Trunk, a considerable quantity of water being confined so deep, that we cannot distinguish the swelling by y. feel.

Let us next suppose that the water is confined to Sacks, & I shall begin wt. the Preternatural Sacks or Cysts, as they are for the most part small, & the most easily manaaged, in this case the same operation is nearly necessary as in the Hydrocele, &

a Seton passed thro' is particularly proper. I would prefer it here, tho' I preferred y^e Incision in the Case of Hydrocele, because the Cord can have no bad effects but acting on the Testicle & fretting; so in the Hydrocele of y^e Spermatic Cord the Seton is preferable to the Incision providing only we can discover y^e situation of the larger Vessels, without making such an opening as is necessary to bring them in View, we pass thro' the Cord, & occasion a Contretion of the sides, where that is not practicable, the Tumour is large, we endeavour to palliate the Complaint by making a Puncture, but we shall seldom make the Cure by this or by Medicines, it being particularly difficult to Cure Preternatural Encysted Dropsey for tho' the Inflammation may form near Exhalents, yet Inhalents are probably not formed in the same proportion, so the chance of Cure is less than where the Water is confined in the Natural Cysts.

That, suppose that the Water is confined

confined in the Natural Cysts, so take the Peritonæum, as Ascites, where the Belly swells like a Bladder filled w. water. Now first of this very material that you determine not only the presence of the water, but the exact place of it, we know water by the Swelling & fluctuation, with the want of circumstances to produce an Abscess, and the manner of Juleng is this, you lay a hand on one side, & strike with the other, either with a single finger, or with two together, & you can make the water undulate, so that if you are used to the ful, you know it certainly, at y. same time I have seen persons who were supposed to have a Dropsy, & where without touching them I knew there was a mistake, where fat is collected there is somewhat of y. general appearance, but the umbilicus is drawn inwards, whereas if the water is collected it is drawn outwards, if the quantity is small the Surgeon places the Patient in a sitting posture, & bending forwards so as to press

the

the Skin inwards, when he pulses it, but if there is a great distension, & the Skin does not yield sufficiently he will pul it better when y. Pat.t is laid in Bed, & y. Shoulders raised, y. Belly is relaxed, when the water is moved w.t greater freedom.

Next we distinguish the water in y. Ovarium easily from y. Collections in particular Cases by attending to y. Posture, if y. Tumour forms above or below, & extends gradually while in Ascites, the water alters its situation, according to the posture of the Body, so we distinguish it from a Dropsy of the Ovarium &c. but there is one kind of Dropsy where there is more difficulty, & very great danger, if the water is contained in the great Sack to which the Foramen of Winslow leads, suppose it to begin in the Liver, which is sometimes perhaps, & that an Inflammation coming on shut the passage, if the Surgeon performs the operation, he may wound the Stomach, or Colon, before he gets to the water, so he should have the possibility of this in his view, & see if by the erect posture, the

water

Water falls to the bottom of the belly.

Next suppose there is no doubt to be had to the nature of the Disease, & that we are under the necessity of making the Perforation, or suppose that the Patient thinks that he has a better chance of being cured by submitting to the Operation early, than by delaying it long, which is a general Rule in Dropsy, but particularly in Ascites, where the Urine is in danger of not being secreted so readily by the pressure of the Kidneys against the back bone.

The ancients performed this operation under many disadvantages, as they wanted the proper Instruments, instead of the Trocar they used a double edged knife, then thrust in a pipe, which did not fill the hole, nor did they attend to the proper posture of the Body, & they wanted means for making pressure in the Operation.

Now we first employ the Trocar, an Instrument which fills the hole we make, so that we can stop the discharge at pleasure, if in any case that be necessary. Next we attend to the Posture Mr Thorp to this day directs the Patient should be

be last in the sitting posture, whereas he ought to be laid horizontally, we all know that in common cases of Fainting the Horizontal posture recovers persons, & it is especially necessary to attend to this in Tapping, as on taking off the pressure from the lower part, the blood rushes in there, & a small quantity goes to the head, besides there is not one single advantage attends, for if the operation is done in a sitting posture, all below the part where the Instrument is entered remains full of water, whereas if the orifice is made at the side in the Horizontal posture, it can be made the lowest part of the Belly, & we can draw off every drop of the water, the last advantage was first pointed by Dr Dwarney & more particularly by Mead, the making a pressure in time of, and after the operation, it is generally directed to be done by means of a Roller of Flannel, wch at first may answer tollerably well, but we need to shift it, so that it is more convenient to have a Belt. I shall show one which was proposed by

by my Father in the Med. Ess. says, it is made of Flannel to lie next the Skin, but strong Linen is joined to it, by which it does not yield so readily. It is put on before the Operation, & there is a sufficient opening where the Orifice is intended, we draw it with Buckles & to prevent it from sloping, a Strap goes round each Thigh, now instead of that I've caused be made a more convenient Bandage, a Cloth waistcoat with 9 or 10 Buckles, & a Strap round the Thigh, there is an opening in the side, or without attending to that circumstance we may turn back the waistcoat till the water is all discharged. For y. Operation we ought to be provided with Trocars of different sizes for common use, one of that size I show you will answer very well, but sometimes the Water grows Glutenious, nay we have a few Examples where Hydatides were found in the Cavity, and an Incision was necessary to let them out; the Patient is laid on the very edge of the Bed, with the side over the very edge of it, and you put round a pin

of flannel, the ends of which may be taken up on a bit of Wood, but the wood must not be very long, otherwise at the end of the Operation it presses against the parts, so you take a short bit, such as you can easily twist. Next you determine the place of the Puncture, which aught to be half way betwen the anterior Spinal procs of the Os Ilium & the Umbilicus, where the Bowels are not timely applied to the Peritonæum, but where the water has got betwen the fore part and the Bowels, generally we prefer the left side, because the Liver is most frequently Diseased, but the Splen may fall down by its weight, and we ought to examine this as well as we can.

That the Trocar may enter readily it is proper to make an Incision in the Skin with a lancet, and making a regular allowance for the thickness of the Tegumants, which are much thinner in Dropsy. The

The Surgeon puts his finger on the Trocar
[a] like a Drill till he finds the want of resist-
ance, then taking hold of the Canula with one
hand he withdraws the Trocar (Perforator) with the other,
and putting the Patient into the proper pos-
ture, he keeps up the pressure the whole time
the water is running out. This is of the ut-
most Consequence, otherwise Mortification
or Gangrene may be brought on, from
the faintness of the Blood stagnating in
the Lungs, in consequence of the lax state
of the abdominal Muscles. I had occasion
to see the Effect of pressure to a remarkable
degree where 120 English pints of water
were drawn off in two hours, by the time
the water was half drawn off the Patient
herself discovered the effect of the pressure,
and on growing faint she cried out to pull
the Belts, & by applying the pressure properly
she was not more faint at the end than
at the beginning, but a stop was made
at every Bason full to give her a little time
[a] that he may go no deeper for with the Trocar which

which is always proper. If a turn of the Gut &c stops the flow of the water, we put in a Probe, but it must be bended, lest it fall into the Cavity of the abdomen, and if in any Case the Patient grows so faint, that it might appear unsafe to draw off the whole at once, there is no occasion to entertain the notion of water putrifying, tho' we wait a day or two. I've known the one half drawn, & with relief, and the other half not drawn off till 8 or 10 days after. After it is all taken away we withdraw the Canula, & put on a Patch, and on introducing the Trocar we slip beneath the skin a little way, and then slip it in, which prevents an oozing which might excoriate the parts.

As the Disease generally returns, Substances have been thrown in to heal the mouth of the Vessels, and one or two lucky Cases have occurred where a compleat cure was obtained in this way, one of the Patients was seized with an Iliac passion, i.e. an

an Inflammation of the Bowels, I suppose this was owing to mismanagement in the operation.

In the Philosophical Transactions you will find some such attempts, with irritating astringent Liquors, in one case they produced a Cure, in others they were the cause of Death as they did not try the Experiment first on Quadrupeds. they used Tar water, & trying ye same Experiment on a sound Dog he died same time, & I know that several Substances which can be introduced into ye Stomach, & return without any fatal effects, kill quickly when powred into the Peritonæum, thus Opium has a much greater effect when powred into the Peritonæum, than when taken into the Stomach, but suppose next that these fail, some have proposed to introduce a Seton, and Dr Young tells me that he has seen this tried, but they were obliged to withdraw it. I might have added when speaking of the Injections, that perhaps we might inject air which might occasion an

In

Inflammation sufficient to bring on the adhesion of the parts, and on Dissection we can often not discover the smallest Disease in any of the Bowels, nothing but a general state of Relaxation, but suppose the Seton necessary, you introduce it w. Heister's Trocar, you enter into the cavity of the abdomen till you feel a want of resistance, then draw back the Perforator till you bring the Canula to its proper distance, when you bring out the Trocar, then with drawing the Perforator & introducing the Seton, the water runs along. There is one other account on which the operation ought to be done, in consequence of air infused. I told you the signs of this, and the manner of doing the Operation is evident, I avoid saying any thing of the Dropsy in the Thorax at present.

With respect to the Head I have only to observe that in some few Instances an external Hydrocephalous happens in a strumous Sack

Sack, particularly in Children at birth, & if this continues long a Coma may be passed thro' them, but for the most part they gradually disappear, the water besides may be collected both without & within y. Brain, but in 99 Cases of 100 it is within, & there is a dilatation of the head even when water is within oftener than Dr. Whytte is aware of, who in other respects has wrote better upon that Complaint than any other person, but where there is any probability of its being on the outside, we may cut the skin, then scratch the Dura Mater at the side of the Bregma, where the Bones are most open, and if there is no water we would stop, but if any we would let it out, making the proper Compressions.

Lect. 105 M.

End, the 1st

Lecture 105th

A Correspondent properly observes that when we attempt to reduce a Hernia, by raising & agitating the Body, attention should be paid to the state of the Respiration, i.e. the Patient is not to resist by Inspiring, but to slacken the Abdomen. When speaking of looking for water within the head I thought unnecessary to mention my reason to dissuade you from letting out the Water from the Ventricles of the Brain, which must prove fatal in consequence of the Wound thro' the Medullary part of the Brain, nay if you could suppose it in the power of the Surgeon by a wish to remove the water, the parts of the Brain falling together would unquestionably produce fatal Symptoms, supposing the quantity collected to be considerable, such as by Distension we could discover.

We now proceed to the Paracentesis of the Thorax, which requires to be considered a part, as we want the evident fluctu-

fluctuations of the Fluids to discover ye presence of the Disease, & in consequence ye difference of the Structure, the method of operating requires to be varied. It may be necessary to perforate the Thorax in consequence of air effused, or water or Pus, or Blood, you recollect what I proved w.r. regard to the manner of the Respir.n, that the Lungs with respect to their Dilatation are merely passive, that they are kept contiguous to the containing parts, & follow their motion only because ye air by its weight acts against their Inner side, having no other inlet but by ye Trachea Arteria: this being understood, you foresee the danger w.ch must attend ye openings made thro ye Containing parts in a sound Animal, if ye if such be large, ye air comes to be applied to the outer as well as ye Inner side, so ye ye Lungs remain nearly immoveable, supposing the Operation done on both sides at ye same time if ye opn.n be done on one side & a large opening made, the Lungs on ye side receives its motion in greater measure from ye other side, i.e. the

animal

animal by an Instinct of Nature, when about to expire contracts the Glottis, that while y.e sound side is performing Expiration, the side w.ch y.e opening is performing Inspir.n, or rather is distended, life is continued therefore in y.e imperfect manner.

If however y.e opening be very small, y.e air, whilst y.e Animal makes an attempt of Inspiring, raises y.e containing parts suddenly, entering however in smaller quantity by y.e narrow wound than by y.e Trachea. There may be some imperfect degree of dilatation, so there is danger attending even small wounds made in a sound animal. How comes it then y.t Surgeons in Cases of Disease perform the Paracentesis, or make Incision without any danger following? The fact is, y.t y.e Lungs is not more oppressed by y.e air let in than they were by y.e matter lodged between them, & we must add y.t whilst y.e matter w.ch was collected gets a discharge, for y.e most part Partial adhes.ns support them Mechan.y so y.t they are dragged along w.th the containing parts, or by y.e adhesions they are

pre

prevented from Collapsing.

Next let us attend to y. diffi~~cult~~ Circumst-
ances y. you may render y. operation necessary-
and I begin w.t Air effused, this may happen
first from the tender thin membrane covering
the Lungs even w.t y. continuation of y.e Pleura
added to it may from a violent effort burst,
nay you would rather wonder that this does
not happen oftener. The chief reason why it is
so seldom is that the membrane of y.e Lungs
tho' thin & weak, is not kept in its full stretch,
for we can make the Lungs swell beyond the
containing part, the membrane of y.e Lungs is
therefore supported by y. containing parts,
just as a thin bladder covered w.t Leather re-
ceives strength additional from y. Leather,
so y. it is not in our power by a blow to make
it burst, but sometimes this does happen,
an Instance of w.ch I saw when I was at Berlin
w.t D.r Mikle in 1757. in opening the abdomen of
a Subject we were surprised to y. y. Diaphragm
was convex towards the Abdomen, we sup-
posed

supposed y. water had bin accumulated within y. Thorax, but on cutting y. Diaphragm, there was a blast of wind, & examining further y. Lungs on y. side where we observed y convexity were squeezed into a small bulk at y. top of the Thorax & there tied down, no hole could be observed, nor did air escape from y Trachea Arteria when blown in, so y. Lungs had burst. Michel who has published this Case, supposes Mucus to have gathered in y Trachea, so as in some measure to have obstructed y. passage, & y. y. air in y. Lungs heated by y. body occasioned y Rupture, but it is more probable that it was occasioned by some violent effort, & y. passage being oblique, it might not be able to return, so y. gradually more had bin accumulated, till y. air was condensed so as to squeeze y Lungs together, & then an Inflammation was excited, wch probably had soldered y. original hole.

Next we may conceive y. whilst by membrane of y. Lungs gives way, the Pleura lining y. Ribs shall likewise give way. Of

thes

this I have met w.th 2 Examples. a man of 35 years of age, not subject to y.e Pulmonic Complaints, further than he had a Cough in y.e morning as many of his time of life have, during his ordinary Cough he was struck w.th a violent pain, & in y.e space of a few hours he observed his sides to swell, the Swelling extended over y.e Thorax & face, so y.t touching y.e Skin there was a hard crackling like y.e of a dried Bladder filled w.th air, & on mentioning this Case to M.r Hamilton, it put him in mind of another Case of a Girl who in Child bed trying to stifle her Cries least she shd be discovered, observed a Swelling to begin on her body, w.ch extended a considerable way w.th oppression & sickness, but it went off of it self. Now suppose next y.e a Rib is broke, & y.e end bent inwards, you may conceive y.t y.e Lungs may be wounded, the air getting out may be confined within y.e Pleura, getting out thro' the oblique wound of y.e Lungs, whilst y.e Pleura is prest against y.e Intercostal muscles w.ch acts as Valves, but generally if the Volume of

of y. Pleura is considerable, y. air will spread from y. Cavity of y. Thorax into y. common Cellular Substance, & so get out between y. fibres of the Intercostal Muscles under y. Skin, & be diffused universally.

There is one other probable method in wch an Effusion of air may happen, y. Lungs may be corroded by an abscess, & y. Membrane destroyed Pleura & all, so y. y. matter gets outwards, & y. air will escape wth y. matter, & get into the Subcutaneous Cellular Substance, or if y. adhesion be complete, a portion of y. air may escape into y. Cavity of y. Thorax, & in fact in some cases when matter was collected in y. Cavities of y. Pleura, it was found mixed with air, there was Bubbles of air burst out wth y. matter, as soon as y. Incision was made. We might form other Suppositions, as y. the proper Membrane of the Lungs gives way by an Effort in y. Interstices of y. Lobules, & the air escapes into the Intermediate Cellular Substance wch lies y. Pleura & the Lungs

End

and so on to the thick Skin, but in the Adult these parts are so closely connected that this will not readily happen.

Next let us see by what marks we know & remove these Complaints, in describing the several possible Cases the Symptoms were in a great measure pointed out. A Person after meeting with some accidents is seized with a very sudden oppression, where there is no room to imagine y^e^ Pus is collected, or Blood effused, or there is not the paleness w^ch^ attends Hæmorrhagy, & no blood is thrown up from y^e^ Trachea Arteria. So we are led to ascribe y^e^ oppression to air contained betwixt y^e^ Lungs & Pleura, and this may be so condensed as to press on them more than if a Wound were made in the side, & if they were exposed to y^e^ Atmosphere, there may be an actual Condensation, the Patient feeling a difficulty in the Respiration by an Instinct of Nature the Glottis is more contracted than in health, & pushing out y^e^ air w^th^ Violence, it passes thro' y^e^ oblique wounds,

and

and

and can't return, so is condensed to a great degree.

Now in such Cases we may relieve or cure y. Patient by the Paracentesis, & certainly there is great room for proposing such an Operation, when the Lungs & Pleura be grown together. I caused it to be done to great advantage. I have given the history of the Case, the Patt was exceedingly oppressed, not able to lie horizontally, but was panting for breath, & felt y. greatest degree of weakness, at the same time the face was flushed & y. Pulse small & quick. I made him describe y. place where he was struck w.th y. pain, it was in y. right side about the middle, so I caused the Surgeon make an Incision at that very place, as y. air had got out into the Subcutaneous Cell.r Subs.tce, I thot. by y. person might be relieved by the Incision, & y. further diffusion of the air prevented, this however proved ineffectual, we had no certain guide to lead to the opening, & it did not take off the pressure from y. Lungs, so I next caused a Perforation to be made

with

with a Trocar, which was introduced slanting under y^e^ Skin & Cellular Substance, & then y^e^ point turned inwards & worked like a Drill, till from y^e^ want of resistance we found that it had entered, & then withdrawing the Perforator, we kept in the Canula, & there was such a blast of air, y^t^ we lighted a Candle 3 or 4 times, w^ch^ was put out by it, & it was as violent as from air condensed in a large machine, we then observed the motion inwards & outwards accompanying Respiration, & y^e^ Instant y^t^ y^e^ air ceased from blowing y^e^ Pat^t^ found Relief, lay back in y^e^ Bed, could keep the Body in any posture, & the pulse fell remarkably: as we were not provided w^th^ a better Instrument, we left y^e^ Canula of y^e^ Trocar in a Slanting way, & ~~& pinned it w^th^ a Bandage~~ next afternoon we found on trial that she could breath with ease, & that no accumulation was made, tho' y^e^ Canula of the Trocar was altogether stopped, y^e^ hole had shut up, y^e^ Inflam^n^ had ceased, so that now the Canula was withdrawn, & the Pat^t^ was restored to his former state of health, in

in about a twelvemonth afterwards he was
seized w.th y.e common Symptoms of Inflam.n
of the Lungs, & died of an suppuration within
them. now on y.e whole I am clear y.t in such
a case there may be y.e utmost relief from the
operation I have mentioned, & y.t Causes requiring
y.e operation will occur very frequently, but the
Cause has not been understood, nor properly
attended to, such Cases in y.e following fractured
Ribs have happened often, & y.e Pat.t have lost
his life from y.e Surgeon's being ignorant of
the true Cause, & y.e manner of curing it.

Next y.e Trocar is y.e proper Instrument, & we
are not to think of Incisions, for tho' we are
mistaken, if we use y.e small Trocar, y.e Pat.t
will not receive any material Injury, & we
take one y.t has a blunt point, & enter it into
the Skin, then obliquely into y.e Thorax, working
it like a Drill, so we may enter it without
wounding the Lungs, & unless we are very
wrong in our Conjeture, if air will support
y.e Lungs, but I suppose y.t we do not find air
come

come out, that is not a material Injury, whereas the Incision is very dangerous, producing violent Inflammation from y. air getting freely in. if we mean to keep a Tube in, we prefer to y. Cannula of y. Trocar, a hollow Catheter, or hollow Bougie, nay w. such an Instrum.t we can do somewhat more a person can apply his mouth or a Syringe to y. Tube, & such very particles of air out of y. Thorax.

I shall next put the Case of Water being collected, & let us see how we are to distinguish y. water, w.h I apprehend we can do w. a high degree of probability, the general marks are well enough laid down by accurate Writers, as by D.r Cullen in his Nosology, what I have seen are these, the Cat.h is of a Dropsical habit, or some Complaint has preceded it. often has indued this, where there has been a slight degree of Inflammation, & that seems to be discussed. often a disposition to Dropsy succeeds, as in the Scarlatina w.h occurred last year, a Dropsical disposition shows it self after that Disease, or where there were Com-

plaints

complaints of pain about the Thorax, & were not followed by marks of Suppuration, in some time afterwards a Dropsy has formed within it, or the Disease will come on without y. Pat. being sensible of any Cause, the Urine is often tho' not always, scanty, for in y. small Cavity y. difference of y. Urine is less remarkable than in the ascites, but still it may be observed to be scanty & high Colowred.

Next the Patient feels an oppression about the Breast, has a difficulty of breathing, particularly in attempting to walk up hill, has a Cough, but without spitting from y. Trachea, it is tickling & dry his feet are apt to swell at night, after the Disease has made some progress, the Sleep is much disturbed, y. weight of the Water pressing upon the Organs so very material to life, affecting the Vessels of y. heart as well as of the Lungs, so he awakes frequently, has disturbed Dreams, & we distinguish y. y. Water is not within y. Pericardium, we produces all y. Symptoms I've mentioned,

by

by our feeling the stroke of y^e heart, whereas when y^e water is within y^e Pericardium, y^e Heart is buried in it. Then we ought to attend to y^e posture of y^e Patient, y^e he is much easier in y^e erect posture, & on lying down he feels an oppression, for when he is erect y^e water pushes down y^e Diaphragm, whereas when lying the Thorax is ~~restrained~~ by y^e weight of y^e abdominal Bowels, but there are some further circumstances, one of which I have not been sensible of, but ~~I am convinced~~ have no doubt of it, i. e. the Percussio Thoracis, it does not sound like a Drum containing air.

Lastly the undulation of the water may be perceived in several cases. I've observed y^e where water is collected, it does not always float freely, but there is surrounding y^e bag an universal adhesion, but if y^e Disease comes on slowly without Inflammation to produce a Connection of y^e parts, the gliding of the water can be felt and heard.

Now suppose from all these circumstances con

concurring that we are certain of the pressure of water, should not we attempt to relieve y^e Pat^t by an Operation? It has been done but seldom, because till of late years y^e marks of water were not clearly known.

Next, as the Disease often proves fatal, & y^e making a hole in y^e Thorax is looked upon with a dread, Surgeons did not attempt any operation, least they should be blamed for the after death of the Pat^t, but there is no doubt but y^e operation would be more successful here in many Cases than in the abdomen, tho' in other Cases the Disease is desperate, as where the Cause of the Collections is rooted in the Diseased Lungs, a Scirrhus or hard state of them producing it in the abdomen, in other Cases I've observed y^e water & viz^t it an ossification in y^e mouth of the aorta, for as an obstruction in the smaller circulation frequently produces Dropsy in the aortic System, so a general obstruction in the Aortic System will occasion Dropsy in y^e Pulmonary, & in such Cases there is very little hopes of a cure, but it is just as possible

to

to Cure a Patient of a Dropsy of y. Pleura, as of the Vaginal Coat of the Testicle, it may depend upon an unknown Disease in y. extremities of the minute Vessels, & we obtain a Cure by producing an adhesion between the Lungs & y. Pleura, & yet a Respiration may be carried on tollerably well, may we generally find a partial, & often a total adhesion of the Lungs to the Pleura, so we not only obtain a Palliative Cure, but we may make a Radical Cure of the Disease, we may occasion a Concretion of the parts by y. Inflammation without killing the animal, so we would try to determine the proper method of doing the Operation. I would lay aside Incisions w.ch have bun proposed in all Cases, & would begin w.th y. Trocar, & I would first try the effect of letting off the Water, when the action of the air may occasion such an irritation of the Pleura, as to bring on the necessary degree of Inflammation, we would do the Operation early before the Lungs are Contracted by y. weight, w.ch in time presses them to the top of the Thorax, when they con-
tract

contract adhesions. But suppose y. y. water (col
lects again, we would think of an Incision, or
propose a better method for introducing a Tube
rather I would take a bended Instrument, and
instead of being of the Canula shape, flat to
enter between the Ribs.

Next I shall suppose a Suppuration in
the Thorax, how are we to distinguish it? that
is y. great difficulty; I might refer to the most
common Books for knowing when matter is
formed, y. a previous Inflam.n is succeeded by
Symptoms of Suppuration, the Patient feels an
oppression of the Lungs, has some degree of Fever,
has Colliquative Sweats, Shiverings &c.
a difficulty in lying in a particular posture,
by these we distinguish the Suppuration,
but we do not learn where y. matter is seated,
but of this we judge by y. seat of y. pain, &
y. manner in w.ch y. Pat.t lies, who for ordi-
nary sleeps easiest on y. Diseased side,
for when y. Pat.t lies on y. sound side, the
weight of the body straitens y. motion of
y. side, & y. weight of y. Diseased side also
straitens

straitens it, by pressing in the Mediastinum, whereas if you lay y. Pat. on y. Diseased side, you no doubt straiten y. side still more, but you leave the other free, so y. he maintains life y. more easily.

Next it is necessary to know whether the matter is within the Lungs, or without, if the water is in chest, we know y. it is without y. Lungs, but in case of matter it may be within the substance of the Lungs, & not in y. Cavity of the Pleura. To judge of this we enquire if the Patient throws up matter, if he does we know the matter is within the Lungs, but he does not if it still may be within the Lungs, see next ob. some y. the surface of the side, the teguments, for tho' the Disease has not affected them, yet when the matter is near to y. surface, the Teguments are often thickned.

We ought next have recourse to y. stroke on y. side, & last of all to y. fluctuation, the feeling the undulation of the matter, and hearing the noise it makes y. possibility of distinguishing. But I know in 3 Cases, & I was so

or

certain of it y. I caused y. side to be opened, in one Case 3 lb. of Matter was evacuated, in y. 2d. two pounds, the 3d. Six pounds, & the two last Patients were Brothers. Now let us be on our guard not to fall into a mistake here when the Pat. bends his body quickly, or turns side ways, or when a person is placed behind him on a low Chair, & takes hold of y. Shoulders, and makes these motions, the noise of y. matter can be distinguished, as we hear y. dashing of water in a Bottle half full. But some years ago I had a clear proof that we can't trust all together to y. noise, when I was upon this Subject, a young Gentleman attending Lectures took the fancy he had the Dropsy, & was Dying, & wrote so much to his Friends, I was called, & was surprised to find a fat well coloured fellow dying of the Dropsy, but he told me the thing was beyond a doubt, for not merely a motion was felt, but it could be heard, & I heard it most distinctly, by making a particular motion there was a very

loud

loud noise, but I found y. he had drunk pretty freely of Water, may be had done so on purpose, for his Idea was, that the Stomach needed to be distended before it could press against the Water in the Pleura, now here is a clear proof that by such a motion the noise of Liquors in one's Stomach may be felt, so we shd. feel the Liquor strike y. Thorax, y. it dashes against y. part of y. Side, & we should mark the middle place w. Ink. Now suppose y. we have discovered the Complaint, & even where y. matter is within the Lungs themselves, it appears in y. form of an abscess & we have Symptoms of Suppuration, y. y. Patt. discharges perhaps from 4 to 20 ounces & more of Matter, I would be inclined to try some opening lawfor in y. Thorax, for every abscess heals diffy if y. opening is at y. top, so if there is a fixed pain, & perhaps a Swelg of y. Tegiments, y. Patt will have a much better chance by making an Incision than in y. Common way. Suppose y. operation de-

determined to be done, the place is pointed out
from y. undulation, but if y. motion is general
it is left to y. choice of y. Surgeon, he makes it
half way between y. top & bottom, & also be-
tween the fore & back parts, for if we go low
y. Diaphragm may come in the way, it being
nearer to the side, & it may have contracted ad-
hesions, then having determined the place,
instead of the Erect posture, we lay y. Patient
Horizontally, whereby he is less in danger of
fainting, & we can make the lowermost part
as to the operation it is so simple that it
is hardly necessary to shew it, in a Case of this
Consequence we are not to mind the fibres
of a few Muscles which are said to come in
our way, as the Latissimus Dorsi, we are to
make the Incision we. is the most favour-
able for the purpose between the Ribs, we
cut parallel to the Ribs, & we do not make
one Incision humouring the External Mus-
cles & another the Internal, we use a Com-
mon Scalpel, & make the Incision farther
from

from the upper Rib, than the under, on ac-
count of the furrow for the Vessels & Nerves,
& in order to give the matter a free discharge
I make the External Incision large & free,
then I proceedly slow Incisions, avoiding
the Internal muscles till I've laid open the Pleura
in View. I then have ready a small furrowed
probe, & scratch a hole in the Pleura, with
my knife, making it very small. I then In-
troduce an Instrument for directing it, &
use the Knife with the blunt point, & I
make a hole big enough for the discharge
of matter. Now this is the common me-
thod, but I am very doubtful whether
we had not better use a Cord, w.ch answers
in Common abscesses where the size is
very considerable, & the irritation may
be too violent from the Incision, w.ch perhaps
lets in the air too freely, but whether we
use the one method or the other, we may
be under the necessity of trying to prevent
all the matter from getting out at once,
as

as the Lungs comes to be too loose), & some take it off gradually, but we need not stop so often as has been directed, for in the Case where 4 or 6 pounds comes off, every drop of it was discharged in two minutes, & the patients were greatly relieved, if not by having oppressed them more than by access of the air. we dress in the plainest way, & we are not to think of a Canula, there being no necessity for using anything to keep the wound open, the best Dressing is to lay a piece of cloth as broad as the wound, over it, & on the outside of it Lint, w^h you press against the side of the Wound, then you apply the Common Bandage

When Blood gets into the Cavity of the Thorax from a Wound, Sharp advises you not to meddle w^h it at all, but says he we are not to make an Incision if time the blood is running, because if a person's nose bleed there is no better way of stopping it than by letting it gush, by pressing the nose, & never, tho' a great quantity is discharged, if absorbing Vessels will take it up again. Now we

are

are by no means to follow Sharp here, for if a person receives a wound in the Lungs. I would adedge tt. tt. wounded vessels will more quickly close if the air gets to them prettty freely, than if we keep it out, so tt. it will not alter the case much whether we make the Incision in the side or not. & therefore from wd. Symptoms, as the paleness of the Patient, the oppression of his breathing & the weakness of his Pulse, there appeared a good deal of blood pouring out, I wd. be very much tempted to dilate the external wound so tt. tt. Blood may get out from the Thorax as fast as it comes from the Lungs, as it will be mixed wt. a certain proportion of air, it will readily clot within the cavity, so tt. it is in vain to throw in Injections to dissolve it, nor can Sharp prove tt. a great quantity, suppose 2 lb. can be absorbed wt. any degree of safety, as mixed wt. air from tt. wound of the Lungs, it would putrify, corrupt, & destroy life.

Next if a Surgeon is called where there has been a Collection of Blood within the Thora

Pleura: is he to trust that to Nature? certainly not, but rather to make an Incision on ye side and let it out

Lecture 106th

I proceed to explain the mannagement of other kinds of Tumours wch admit of Cure by Oper.n viz. Abscesses, Hydatides, the Tumours wch have been named by Authors, Atheromata melicerides Talpa, with the treatment of Steatom of Carcoma, & that degenerating into Cancer &c and we begin wth ye kinds of Tumour ye are ye most mannagable, & where ye method of proceeding is determined, & the Execution easy.

Let us first determine the way in wch a Common Abscess ought to be treated, for Authors disagree very materially about it. It is a common practice in France to cut off a large portion of the Tegumentts, on ye supposition ye these be loose after the matter gets out, confine the matter & produce dangerous Consequences. others propose ye a train of Caustic

Nearly

nearly equal to y^e length of y^e Tumour shd be applied, while others instead of y^e Caustick cut the abscess open from end to end. a few imitating Nature satisfy themselves w^th small openings which they procure by means of a Cord or Seton. Now upon the whole if a collection is made & y^t we clearly perceive a Scrophulous taint, let the Surgeon be cautious how he attempts any operation, for he incurs blame without the prospect of doing much service. If the Tumour be small, tho there is an evident fluctuation, he leaves the Cure to Nature or he applies a common suppurating poultice to the most depending part. but if y^e abscess is apt to spread under y^e Teguments, y^e danger being in proportion to the Cavity, as soon as the Fluctuation is evident, he ought to let out the matter, or it leads to y^e general point w^th reg^d to y^e Surgical treatment of y^e abscess & I am satisfied from comparing the differ^t Methods, y^t y^e nearer we imitate y^e method of Nature so much the better. The cutting out large

large portions of the Skin is unnecessary, & y.
making large Incisions admits y. air too freely,
wch proves hurtful, a great degree of Inflamn &
Suppurn succeeds, whereby y. Constitution receives
a violent Shock, so y. best method is to use the
Seton, we introduce a Cord giving a favour-
able discharge by introducing one end of it at y.
very bottom, & y. other as y. situation of y. Tum-
our best allows for passing, if we use the
Crooked Trocar of Heister, only having y. perfor-
ator of y. flat Lancet shape, or if we want
such an Instrument, y. place of it can be very
easily supplied by a common Probe & Lancet,
it will answer best to make the opening
at the top first, y. y. matter may not ruin
out till I have passed my Cord, I then intro-
a long probe thro the Abscess, till I bring
the point of it to strick y. Skin below,
I cut upon the point of it, & bring thro the
Cord, we draw the Cord every day, bandaging
the Abscess properly so as to prevent y. matter
from lodging in Cysts & forming Sinuses, &
too

to assist the skin to recover its tone. If we observe y. matter is too much confined, we enlarge y. opening or cut upon the Cord, as far as is near y.

Next suppose in y. Abscess Hydatides, or that a Bag is filled w. them, the method of Cure differs in no other shape, but y. largeness of opening is necessary, & y. we cannot attempt y. Cure by a Ligature. As to y. nature of these Hydatides I am at a loss to determine, they are not changed Lymphatic Vessels as some have imagined, nor are they parts of the Cellular membrane joined to y. rest of the body, for there is no Connection by means of Solids, neither do we find Blood Vessels running upon them, you know y. y. Hydatides, at least such as are taken from the Liver, are supposed to be worms. Now I examined these I show you, which were discharged from an Abscess in y. Loins, the very moment they came out, but I could not observe any thing of Life in 'em, there was not the least Spontaneous motion nor by bruising & tearing them could any

Con

contraction be sure, but they are different from many of the other ~~many of~~ Hydatides, they want a double kind of skin, and a number of Vesicles upon y^e inner side, w^ch I take to be a kind of Ovarium, here there were no smaller ones within larger, but a N^o of diff^t sizes floating in the same Cavity, & as to y^e point y^t y^e smaller are found within the larger, I've not seen an absolute proof of it. Now whether can we imagine y^t y^e Cellular Substance becomes Diseased, & a Number of Cysts formed in it containing matter, as in the Preternatural Inveterated Hydrocele, & y^t in consequence of a Suppuration the Bags are loosened? I leave the nature of them to be enquired into by future observations, but as to the Method of Cure, we give them a free Discharge, & from y^e Case I've mentioned it would appear y^t a bag formed by them is more disposed to heal up than common Abscesses.

Next let us suppose the Case of Atheroma, Meliceris, or of Talpa, w^ch is such a Tumour in y^e head, the treatment of these

was

was explained in speaking of y^e Preternatural Encysted Dropsy, we either remove y^e Cyst all together, or we dispose it to slough off or Granulate, making an Incision thro' them & exposing them to the air, or pass a Cord thro' them, generally speaking the first is the best method, & in Talpa in particular it can be executed w^t great ease, before I knew the Connection of that Tumour to y^e Tegument, & to the Cranium, I caused the Surgeon to make a Circular Incision of y^e Teguments, & to Dissect out the bag entire, w^ch was tedious & painful, but on Examination I found that the real Cyst & the bag containing the matter had little adhesion to the common Teguments, so y^t I could separate it w^t the point of my finger, & y^t it was not necessary to use the Knife. So the next I met with, I caused the Surgeon make a longitudinal Incision upon the large bag, then slitting it open to pull away the Cyst, which was done with ease, & coming to y^e other smaller

Cysts

Cysts instead of cutting in to them, wth y. point of
the finger he turned them out quite entire, by
the by this easy separation would dispose us
to think y. these may form Hydatides, but in
general in other parts of the body such Cysts
are firmly connected, the method of treating them
therefore is plainly this. To save y. Teguments as
much as possible, if the Tumour does not exceed
the size of an Orange, we scarce need cut off any
of the skin, providing it is not Diseased, but
we merely make a Longitudinal Incision,
then instead of following authors, in attempt
ing to take out y. bag entire, having attached
it a little, so y. we can get hold of it readily,
we on purpose cut into it, when we can sepa
rate it wth y. knife more readily, & if no large
Vessel or Nerve is Contiguous, but if there is
any hazard of cutting these, we leave it, &
the succeeding suppuration will make the bag
granulate or throw off, so there is no danger
of a return, providing you expose that part
of the bag left freely to the Dressing, & to y. air.

What

What I've said applies to the Atheroma & Meliceris, but there remains one more kind of Cyst, what is called Ganglion, wch is the liquor collected in y. Bursa mucosa, but Anatomists have overlooked these Bursa arround every one of the Tendons. as to the Cure, many have made it by giving a violent blow, & bursting the Sack, but it is better to penetrate the Sack wth a small needle, & draw a Cord thro' it, whereby you make the Cure wth great safety, tho' I am much perswaded that Tendons have less sensibility than is commonly supposed, yet I don't recommend the slitting open the Sack, because of the Inflammation wch might follow, so a small Cord run thro' such a Cyst will be the best Method of Cure.

Let us next consider y. treatment of the Steatom. Authors have considered that as Incysted. they speak of a Cyst y. incloses, & next they conceive y. a single particle of Fat. or Follicle is enlarged, so as to form

the

the Complaint. Now both these Opinions are without foundation, for a Steatome consists of Millions of Follicles, & has in all respects the same general Structure as any other sound part of the Fat, as far as can be observed with the Microscope, there are shut bags collected into the lobes, & these are tied together by the common Reticular or Cellular Substance. Neat there is no general Cyst containing the whole, but y. utmost Cyst is merely the Cellular Substance condensed, as by blowing into it we can change it into a Reticular matter.

Upon the whole, if more one thinks upon y. manner in which it may be produced, the more he is puzzled to account for y. Cause of it, it is not an Extension of original parts but a vast Collection of new parts, added to a particular spott of the Body having y. same Structure as the Sound, the degree of Consistence vary very much, we sometimes find it not firmer than axunge, & in of. Cases it approaches to the hardness of Sarcoma. or we find a Mixture of a reddish fleshy Many like Substance

Many, as Haslon, advise to discuss a Steatom, or to restrain its growth by applic.n of pressure, the Surgeon will lay plates of lead over them, but all such attempts are not only fruitless, but hurtful, but instead of succeeding in restraining the growth, we cannot do any thing w.h will more promote it, whatever irritates the part makes it swell, so we would lay aside all thoughts of that kind, & w.h respect to Medicine, we have no instance where a Steatom was put away by any course. Pat.s have undergone long courses of Cicuta or Mercury, but to no purpose, so if the Steatom is situated that it can be removed, one would never attempt to put the Pat.t under the course of Medicine that can affect the Constitution, or use any outward applic.n that is irritating, if we are forced to humour the Pat.t let us apply something innocent, but if he submit to the proper treatment, it should be cut out as soon as y.e nature of the Disease is clearly marked, because it is the nature

nature of it to increase in a gradual & constant manner, & to become more dangerous, nay as it increases in size, it alters in nature, so y^t a blow &c produces a new working within it, w^ch may end in Cancer, or after the extirpation a Cancer may come in y^e place of it: With respect to y^e manner of extirpating, if the Skin slides on y^e Tumour, we make a ~~straight~~ curved Incision, draw it back, & take out the Steatom, & tho' it is of great size, in a few days the Skin will recover its Tone.

Sarcoma, The next kind of Tumour is called Sarcoma, which term has been applied in a very vague way, the Scirrhus of y^e Testicle has been called ~~Scirrhus~~ Sarcocele, or Sacoma of the Testes, but besides the Scirrhi of Glands, Substances formed in different parts of the body, and of Red Colour, nearly that of Muscles & many vessels entering them, but without any regular fibrous Structure, they grow from y^e Throat, or within the Rectum. Now as regards these, many are not apt to return if cut early, or even when they do return, it is in their first state

State, they do not put on the Cancerous appear-
ance, but if such a Tumour has remained long
it becomes unequal in its shape, & from Irrita-
tion is more apt to degenerate into Cancer, than
the Steatom, so we aught to be more attentive
in making an early separation of it, & it is a
piece of plain Dissection.

The last Tumour is the
Scirrhus, by which we understand a swell-
ing of such a nature, as with time, or from
Irritation, or when broke, or exposed to the
air from any Cause degenerate into a Cancer
i. e. if the Tumour has ulcerated, we now
call the Disease Cancer, to which before we
applied the name of Scirrhus, & as no part is
more subject to the Complaint, or more freq-
uently requires an operation on y^e account
than the Mamma. I shall consider it as a
general example - We find then y^e Scirrhus
can be produced in the Mamma from Exter-
nal Violence, as a blow given to a Person in
perfect health, & generally if a hard lump
forms

forms in y. Breast after a Blow, & it remains for some Weeks in it, should it break, y. probability is, that the Ulcer will not heal but run into a Cancer. & I would make a gen. observation that Scirrhus degenerating in that manner most readily happen in the Conglomerate Glands, for the Conglobate, tho' they swell in consequence of a Blow, the swelling does not end in the same dangerous manner, & this is likewise true when the Disease breeds spontaneously, in so much that I never saw an Example of Scirrhus & Cancer beginning in y. Conglobate glands, tho' it is probable that this may happen, as the acrid humours from all parts of y. body pass thro' them, but I have not yet met with a certain Example of this where y. Conglobate glands were the beginning of Scirrhus, & of following Cancer. Neat the Mamma is subject to Swelling & hardness, from its office of furnishing Milk, & the different Diseases y. happen in Nursing, we often find large Tumours produced in the Mamma from Nursing, but tho these

gues

give the same feel as scirrhous Tumours form from Blows &c. yet they so seldom degenerate into Cancer, that my Father used to alledge, that he had never seen a single Instance. I may have seen one or two Instances of real Scirrhus & Cancer from Nursing, but trusting to this observation, I have repeatedly seen very great hardness continue for Weeks & even Months, & yet I've ventured to apply a common discuss. Poultice w.th a weak Solution of Sacch: Saturni, & if this brings it to Suppuration, the wound heals readily.

Lastly Scirrhus begins in y.e Breast in a very insensible way, but without any evident Cause, particularly about the decline of life, when the Menstrual Flux becomes irregular, or ceases entirely; & it often creeps in so gradually without any previous marks of Inflammation, that a Tumour is the size of a Walnut before the Patient is aware of it, & it remains several weeks, or Months without giving much pain. Now suppose that

a

a Scirrhus shall form in this insensible manner, so far as I have observed ye common progress is this, that in 3 or 6 Months from the time of observing it, when perhaps it was not above a Nutmeg or Walnut, it increases to ye size of an Egg, in about as many Months perhaps the size is doubled, or it increases to the size of the Fist.

In some few lucky Cases the Tumour remains without sensible increase, or it very little for a No. of Years, but this is not observed in more than one of 20 Cases. After ye Tumour acquires nearly ye size of the Fist, sooner or latter according to the Situation the pains of the Patient increase considerably, she feels a gnawing in the part & pains shooting to the Axilla & Shoulders, & now examining the Lymphatic Vessels & Glands, you will often, but not always feel some of the Glands just behind the edge of the Pectoral Muscle, between that & the Axilla hard, tho not much enlarged, not perhaps bigger than a Horse Bean, & unless a person has been used to the

feel

feel, & knows pretty exactly where to look, he might not discover the Swelling of them. A Surgeon not attentive to the Course of ye Lymphatics, would pass the hand over the part, and suppose all was sound, these continue gradually increasing, & they are succeeded by others deeper & nearer to the large Vessels of ye Axilla, & are felt by relaxing the arm & pressing the point of ye fingers deep into the Axilla. In the space of two or three months more there is a discolouration of the Skin, & it clings to the Tumour, it grows rather thinner, & very often unequal in its Surface, & often ye Nipples are drawn inwards, at least an Erosion begins, & spreads very quickly, in the mean time the Tumour increases, & in some Cases before the Ulcer has enlarged much, it bloods violently, tho' it is not ¼ Inch deep, perhaps ℥xii. of blood or more will be thrown out, & it is restrained to. difficulty.

After the breaking of the Ulcer, in 12 Mos the Patt generally dies, & during ye time she

she is very miserable, & suffering the Symptoms which are described in every book, & that whether Medicines are given or not, for the Cicuta or a small portion of Mercury is given, the Disease will take this progress in 29 of 30 cases. So I would propose that instead of placing our Dependance on medicines, we should attempt to prevent the attempts of the Disease on the Constitution by an Operation, but I find myself in difficulty here in coming to a Conclusion, because several Eminent Writers have discouraged the attempt of Operating, as le Drane & Sharp, & my Father has mentioned that of 60 cases where he had the operation performed, not above five remained free of the Disorder about 3 years after the operation. Now as there is no doubt that this is a fact, & yet I find that the success of operating is much greater than has been supposed, I must allege that by much the greater number were of the worse kind. The practice of Surgery was then a low

low life in this Island. they did not venture to perform operations except in the Capital, but tampered their Patients as long as they could, then sent them to Town, & at length the Cancer was extirpated after the mass of Blood was thoroughly tainted, but let us consider the matter, a person has contracted a Scirrhus from a Blow, surely it will not be said the whole blood is tainted at the first appearance. it takes a certain time before the matter spreads in it, & the Lymphatic Glands do not swell for a long time, so there can be no objection to the taking it out previous to the swelling. But suppose next the Scirrhus spreads spontaneously, you'll say this evidently shows that there is a Cancerous Indisposition in the Body, so that an operation cannot be expected to be attended w^th^ Success. now I do not clearly see that this Conclusion follows, for if the general mass of humours are so disposed, how comes it that the Scirrhus appears in this single point

and

and not in both Mamma at ye same time, but
if the worst kind can be produced by a blow,
& the Constitution tainted, the Tumour may
begin without any Cancerous taint, and the
Taint be communicated to all the other parts,
so let us remove the Local affection, & Pat.
is cured, and we can never pretend to say that
removing the Diseased mass can add to the
taint of the Blood, & the only Injury sustained
is the pain & danger of the Operation, wch are
in comparison slight. but next suppose
the Cancerous, i.e. an Ulcer to have formed,
it is admitted that that Ulcer acts proves the
person very soon, & whilst living she is
in the utmost misery, so suppose that by
an Operation I cannot cure her, & ye
Blood is inoculated w. ye Cancerous taint,
I am doubtful whether a Pat. submitting
to an Operation, & the Disease returns, suffers much more than by allowing the
Cancer to continue, & I know that by such
circumstance many escape. I have kept
a

a pretty exact List of all y. Patients I have attended, taking no account of the Cases where I have seen the Oper.n done in y. Hospitals I've attended. I find that I have attended 17 Patients where the operation of Scirrhus or Cancer in the Breast was performed, & many of them much later than I could have wished, on account there were not only Scirrhi Swellings of the conglobate Glands, but only Ulcers in the Breast, I began in the end of 1766, and the last Patient who is alive was operated upon 2 years ago, & y. Disease has not returned, & the acct. is in this way. In one, the only Case of y.t Kind I have seen, I have heard but of one other, the Patient died a few days after y. Oper.n without any very evident Cause, no uncommon quantity of blood was lost, she seemed well for several days, & in y. night time was seized with a fit very like an apoplectic one, & she formerly had Hysterick Paroxysms, & had no fit like to that of which

which she died. Sixteen of these remain, in 5
only y. Disease returned. 3 I have had no account
of for near 12 Months. & I shall suppose y. one
of these has had a return, so 10 remain, of these
2 languished, were Valitudinary & died, the
one 9. the other 12 months after y. operation,
but I shall add these likewise to y. unfortunate
Cases, there are 8 still remaining, or one half
of y. whole Number, & if no operation had been
performed, I fear would not have been alive
above 2 or 3 of that whole Number. I am much
inclined to be of the opinion y. we ought to attempt
the Cure by an early operation. I have met w.
9 or 10 other Cases w. were Cancers. in one y. Leg
was cut off above the knee, in another y. arm
above the Elbow, yet not a single person relaps
ed, unless in the Case where the Leg was cut off,
& w. had something particular in it, after
a Tumour w. was evidently a Sealom was
extirpated, plates of Lead had been applied, & a
Cancer came on in the place of it at the knee
of the most ugly kind, but he had an uncommon
resolution.

in whom the Tumour might have increased slowly so upon y. whole

resolution, & proposed the amputation, he lived about 14 or 15 months, & had no return, but he dropped down in an Instant with out any previous Complaint, probably not from the cancerous humour floating in y. blood, but from a fulness of the Blood &c perhaps apoplexy more especially occurring from the want of the Limb.

It remains to shew y. steps of y. Oper.n w.ch are very simple. We first examine if we can remove y. whole of y. Disease, we see if y. Breast has no adhesion to y. parts beneath, & if there is no swelling of the axillary Glands, or if there is any if it is such y. we can remove it, we determine w.th reg.d to these Glands as well as we can, by y. feel, by stretching the arm, slackening it, & trying every Posture, but if the Pat.t is fat there is sometimes a swelling in these Glands, w.ch you can not discover w.th y. hand, but you will observe an Oedema about the Breast & side, & from y. Glands being inflicted there is an effusion into the Cellular substance, w.ch prevents

from

from feeling the Glands. Now this shows the necessity after extirpating y. Mamma, of feeling it. & y. finger put into y. axilla. Next to. regle y. Mamma itself, we determine whether it adheres by moving it on y. ribs, whereby we know if it is possible to do y. operation, & we will be still more satisfied if we can find most y. on stretching y. arm backwards, so stretching the Pectoral Muscle y. motion continues. wch shows y. y. Cellr. Substance is loose behind. & if there is no adhesion to y. Muscle. Having determined these points, I would first propose, that altho a very small part of the Breast only be diseased, & unless it be of very great size, we would take out the whole, for the danger is very inconsiderable, & y. pain is not much greater, & y. wound if the skin be properly managed, will heal in a very reasonable space of time, generally it requires about 2 months, tho sometimes 3. To do this operation we do not use great knives to do y. operr. quicker, but the common Scalpel. The Patient is seated

on

on a low chair, & y. Surgeon sits before, while an assistant places himself behind it. one arm over each shoulder to stretch the skin & to take Care of the Bleeding Vessels, gener: ally he keeps his finger on them when they spring, to stop them till y. oper.n is over, but they should be tied up as soon as the bleeding is observed, for from want of attention to this, a great deal of blood may be lost, the Pat.t never fails to grow faint when the bleeding stops, but after y. Dressings are applied they bleed again, & they may burst out a 2.d or 3.d time, so it is rather the business of the assistant to have a pair of forceps in his hand to take hold of a bleeding artery, & to draw it out till the Surgeon tie it. The Surgeon cuts in a circular way as much of the skin as he proposes to remove before he attaches the Glands, & the circle should be some what less than the Tumour, otherwise by y. Skin retracting, a much larger wound may be made than is necessary. He meets w.th y. External Thoracic

Thoracic arteries coming out from y. axilla, &
these must be enlarged in proportion to y. Tumour,
on y. other side he will y. usually meet with
small branches from y. Internal mammary.

Having y. separated the Skin all arround, he
cuts in till he is behind the Gland & detaches it
from the Pectoral Muscle, & suppose y. there is
an adhesion of it to the Muscle, that is not to
hinder us from doing the operation. Albinus
tho't y. y. Incision of it was attended w.th locked
Jaw, & other dangerous Symptoms, but he
was mistaken. The Surgeon examines from
time to time w.th y. finger if he leaves no dis-
eased portion, he then looks for y. bleeding
Vessels which he could not conveniently take
hold of, & draws them all out & ties them.

Next he is to look for swelled Lymphatic
Glands, he puts his finger under the Skin and
examines them, if he knows y. there are swelled
Glands in the Axilla, who wishes to cut out he cuts into y. Axilla of raises y. 2
sides & there is no occasion to cut off a Circular piece
of the Skin, as for the mannagement of the
Wound

wound it is perfectly simple, & will be explained afterwards.

Now tho we have removed y^e Complaint thus, there is a danger of y^e Disease returning, so we ought to do 2 things, the first is to keep in an Issue for ever after. without entering into any reasoning upon y^e Use of Issues, I shall obs[erve] a plain fact, that a Cancer never returns while the Wound continues to discharge freely, yet soon after the Wound heals, it may begin to appear again, so my Father made it a practice to direct an Issue to be kept in a part, you allow it to heal all but a small piece which you dress w^th Issue Ointment. If the Breast is very large & a portion of it only taken away, we ought not to make it in the Breast but if the whole is taken away the Issue answers best in the part. In doing this the Surgeon exposes himself for if the Disease returns, it will be in that part, & it may be said y^e Surgeon keeps it from healing, but yet y^e discharge from the part is better, because it will probably

probably have y^e best effect. If we are prevented from having it there, we may make it in the other arm, especially if we are to use y^e Iodine ointment, which may produce Swellings in y^e conglobate Glands, so that we cannot be certain whether these are from y^e return of the Cancer, or are the effect of Cantharides, & if we have any confidence in Medicines for the cure of that Complaint they will surely have more effect in tending to prevent it. by y^e time y^e Pat^t has recovered y^e Shock of y^e Oper^n she ought to be put on y^e Bark &c. a Milk & light Diet, & she may try a Course of Ficus's adding a very small quantity of Mercury.

Lecture 107^th

I shall next explain the method of recovering Drowned Persons, but I am here only to speak of the Operative part, reserving you to a very excellent paper published this Winter by D^r Cullen on the Subject. We

We cover y^d Body w^th some warm substance, & draw a small quantity of Blood chiefly from the Jugular Veins, as the Vessels of the head are much gorged from the stoppage of Respiration. Now supposing this attended to, the general view which we have is to restore the Circulation of the Blood, you recollect the Experiments that when the heart of a Frog is cut out, y^e animal can move its body for one hour, Life does not then immediately depend upon the Circulation, but it does not long exist without it, in some animals a much shorter time than in others, there is an action & reaction of the Nerves and Circulating Systems upon each other. now where a person appears to be drowned, often the Circulation has almost entirely ceased, yet the Vital principle remains, but would soon be extinguished unless we soon restored the Circulation. So besides keeping the body warm, & endeavouring to ease the Vessels of their load, we mechanically propell y^e blood by proper Friction, and as soon as possible we

we indeavour to restore the Respir^{n} by inflating the Lungs, to which the stoppage of the Lungs has in a great measure been owing. Now as the most simple means of doing that, I would propose that instead of clapping a Tube, or our Mouth to the Mouth of the drowned person, we should blow the air thro' a Tube put into y^{e} Nostrils, w^{ch} is the natural passage for it. The Tube is made to fill one Nostril accurately and as they communicate in the Throat, & y^{e} Mouth is kept shut by covering it wth any close substance, as a bit of paper, & to prevent y^{e} air from passing into the Stomach, another person takes hold of the fore part of the Larynx, & particularly the cricoid Cartilage, & pushes it back against the Oesophagus, & in a dead body stiff with Cold, I can make the whole Thorax move, so I could do it certainly where the Vital principle, or warmth of the body remains, but if we need greater force, we employ the Syringe or Bellows, & we may interpose a double Stop-Cock between y^{e} pipe and the Syringe

Syringe, & throw in heated air, or warming the Syringe in boiling water, it retains its heat for some time. Next it is proper to stimulate the Stomach, w^ch^ warm liquor poured into the Mouth, or we can w^th^ a Tube having near the bend of the Male Catheter, & the Syringe throw a liquor over the Trachea into the Oesophagus, & we next throw the Substances into the Anus, as the smoke of Tobacco, for w^ch^ I've shown you an Apparatus, but it is likewise of use to throw in warm liquor, as Wine & water as a Stimulus to the System, & we may try to bring on a Vomiting w^th^ Emet^m^ Vinum, for if we can bring on a spontaneous motion of the Diaphragm & abdominal Muscles, it will have more effect than anything we can do by art. For Injecting the Liquor into the Intestines we may use a Syringe ——

Going upwards to the Head I find myself obliged to say somewhat of cutting the Sternomastoid Muscle in the Wry neck. Now tho' Sharp &c. speaks of this as an oper^n^

operation that may be frequently necessary, yet I apprehend very few cases will occur, where it can be proper, because it is generally a complication, it does not depend upon a single muscle, but a N°. of parts are concerned, or if the complaint sh^d. depend upon the action of a single muscle, the Patt^t. at first probably w^d. not allow y^e. oper^n., nor the Surgeon think of it, & after it has remained a long time it is difficult to alter the Posture. But should such a case occur, instead of imitating Sharp by thrusting in a sharp pointed Instrument, as the Probe Razor catching the Muscle, & dividing it at one stroke, as the Internal Jugular Vein is immediately behind the Mastoid muscle, & the other nerves & vessels & nerves, we would open the skin by y^e. first stroke, then cutting the muscle thro gradually w^h. a knife, we raise the last fibres of it upon a furrowed Probe, laid thus on this account such an operation will be seldom needed, yet sometimes the skin of the Neck is contracted by burns, & if we find

find that this affects the situation of the head, it will be proper to divide the Skin, & in time of the Cure to turn the head another way, leaving an opening in the wound, which will fill up with granulations of Flesh.

The next Case described as requiring operations frequently, called Bronchocele, by which ought to be understood a swelling of the Gland improperly named Thyroid, lying over y^e^ top of the Trachea & not over Thyroid Cartilage, where that swells immoderately, the Trachea is sometimes compressed so as to suffocate the Patient. D^r^ Cullen told me of one Case he saw of this kind, & D^r^ Gregory of another, & in Gooch we have an Instance of a swelling of the Thyroid Gland breaking in to the Trachea & occasioning Suffocation, so it has been proposed to extirpate it, but this is a very formidable Operation, viz is not rashly to be undertaken, & such swelling occasioning Suffocation is an exceedingly rare occurrance. I have seen 9 or 10 Cases of

of that Gland in some of them the Swelling
of Swelling was considerable in one Case,
not much less than my Fist, yet there was
no particular Compression, & that is seldom
so hard as to grasp the Asperia arteria, in
other Cases it did not increase for several
years & the progness seem very uncertain. I
do not however pretend to know any Medicine
that will discuss such swellings, the Spongia
usta has been mentioned, but I have not
tried it, but I have tried the Cicuta & Mercury,
I have pushed both to a considerable length
in two Cases & in both the Swelling remain-
ed without any sensible increase. After
such a Course in one Case the Gland suppurated,
& had very much the appearance of a com-
mon Scrophulous Sore, but had no appear-
ance of growing Cancerous. I have not met
w^th a single Instance where a Cancer accom-
panied or followed this Swelling, & I look
w^t dread upon the Operation, from the danger
attending Incisions here, on account of the
Inflammation being communicated to the

the Nerve running down at the side of the Trachea, when exposed to the air, because in such a Case, from the large swelling of the Gland, the Nerves come to be entangled in y^e Tumour. Therefore supposing the very worst Case, if a Tumour of this kind gradually straitens the Trachea Arteria, & the Pat^t is in danger of being suffocated, I would propose that we shd cut out the middle part to relieve y^e Trachea, probably a Cancer will not succeed, & perhaps the Gland may shrink by it, & we can do all that is necessary for taking off the pressure.

The next Operation to be considered is

Bronchotomy, or cutting the Trachea arteria, where the passage for the air is difficult, or altogether stoped. I need say nothing w^ch reg^d to the safety of y^e operation, excepting the Skin & Cellular Substance, & then Muscles which we can avoid cutting the thin part of the Thyroid Gland, there is nothing divided, & understanding the manner in which Animals respire, that a

a person can breath thro a hole in y. Wind pipe, as well as thro the natural passage, it will appear evident that the operation whether consider'd with respect to the parts divided or as to the manner of Respiration, is not attended with danger.

We next attend to the different circumstances which may occasion the operation. Sharp only mentions a single Case rendering it necessary, that of the Bronchoule.

Now suppose that I make a hole thro y. Gland & all, I w.d not remove the pressure of from the Instrument, which is too short for reaching the Trachea thro the Swelling, it is with y. he has never performed y. Operation, & there are many accidents which render the operation advisable, & in consequence of w.ch it has been performed. 1.st Substances have suffocated many persons by sticking in the Trachea arteria, several have happened in this place, thus a Cat in y. Infirmary was suffocated by a bit of meat sticking in the Arytenoid Cartilage over y. true Rima Glottidis

Glottidis, now in such a Case there is no other Re-
:medy but y^e^ opening y^e^ Trachea as quickly as
possible. I would not deliberate much about
the manner of doing it, but would take any
Instrument that was at hand, the Lancet,
Knife or pair of Scissors, but mearly reason-
:ing upon it I apprehend y^t^ such an Operation
would appear to be very often necessary, on
account of the Swelling of the membrane
lining the Larynx, for this is the continu-
ation of the membrane lining y^e^ mouth &
Nose, & the latter swells in a Common Cold,
we would be apt to suppose y^t^ such a Swelling
would happen in the Glottis, & Ill show you a
Case where the Swelling of this membrane
was the cause of Death, & the Symptoms were very
like to these attending Peripneumony, & per-
haps were such Cases more common, Symptoms
proper to the Disease might have been found
out. Now such a thickening may not only
come on suddenly, but in a very gradual
manner, the parts in the Throat may swell
in-

in the Lues Venerea, & not many years ago a Case of this kind occurred to my Father, where y^e Person himself was desirous of having the Operation done from the difficulty of drawing his breath.

Next the Neighbouring parts by their swelling & pressure may stop the passage of the air. Substances sticking in the Pharynx may as well as those in the passage its self stop the Respiration, & you will find instances of this in Heister. Next the parts over y^e mouth of the Larynx frequently swell greatly, as the Amygdalæ where the Swelling is just over y^e Throat, & I have known several Cases where y^e Respiration began to be difficult from this Cause.

Next Tumours forming in the Nose & Throat are over the Trachea, but especially Tumours (y^e) form within the Throat, may render the Operation necessary.

I next proceed to show you the manner of doing the Operation &c. & y^e common Scalpel & y^e first Incision is to be made Longitudinally, for if we make it transverse, in the different

and of treating the Patient we begin the Operation

states

states of Respiration the Wound of the Trachea will slip within the wound of the Skin, & Respiration be stopped. Now if the Operation is done nearly to allow a Surgeon to perform an operation in the Throat, a small opening in any suffice, I am led by the feel a little higher than the Cricoid Cartilage, & continue it downwards for 2 Inches or so, dividing merely the Skin & Cellular Substance, & then separate the Muscles Sternohyoidei from each other & bring in view the middle part of the Thyroid Gland which is thin, & I am next obliged to divide it, when I bring in view the rings of the Trachea & Arteria. Now before I divide the Trachea, I allow the Vessel to bleed freely its 2 Views, first a free bleeding will very probably be of use for removing the Cause of the Complaint, as when it is a swelling of the neighbouring parts, the other reason, Q. if smallest drop of blood getting into the Trachea is the Cause of a most troublesome & convulsive Cough. Now having allowed the Vessels to bleed free

or

or if the case is urgent we take up the large
Vessels, and stop the small by Dressings, &
astringents applied. we proceed to finish the
operation, which may be done w.th a knife, tho
I would prefer the lancet, taking one of the larg-
est size, such as is used in forming Issues,
& we make the wound in the Trachea transverse,
otherwise the rings would be apt to fall over
each other, there is no great nicety as to the place,
we go as high as we can, providing we do
not come too close upon the Larynx, we enter
the point of the Lancet betw.n the rings, &
make a sufficient opening larger than the
Rima Glottis Vera. we next endeav.r to fit a pipe
to the wound, tho at first that will not be ne-
cessary, but in a few days it becomes so, other
wise the skin closes & straitens the breathing
before the cause requiring the Operation be
removed, we are commonly directed to tie a
pipe in w.th a Ribbon, w.ch is dangerous as well
as inconvenient, for as from the slightest motion,
or from Mucous or slime collected the

Patient

Patient is seized w. a Cough, he ought to have it in his power to withdraw the Pipe when he feels it come on, & to replace it readily: to ascertain the proper size of the Pipe, I rolled a bit of paper & breathed thro' it, we make the pipe double, viz. the inner may be taken out, & the other left, or in order to clean it, so the inner is made about ½ Inch longer than the outer, & they are made long enough for any case, & to keep the Pipe in its place we use a Common Stock to a Semicircular piece of Metal before, w. a Slider &c. by wch we bring the hole in the pipe opposite the hole in the Trachea, & when the Patt. feels a desire of Coughing, he pulls the pipe out a little w. his hand, & when it is over he presses it back again looking in a Mirror. after the Cure is compleat (viz. to shut the hole we usually use a bit of Patch, & if the sides are callous, we touch them w. a bit of Caustic: where there is no necessity for maintaining the opening we are to be cautious how we apply close Dressings, as the air might get into the Cellular Substance under the

the Skin from the Lungs. The next Operation I shall show is done for a Fissure in ye Lip, called ye Hare Lip, generally there is merely a split in the Lip, but in some Cases this is complicated w. a separation of the Bones of the roof of the mouth from each other, & in some cases the fissure is continued below the Maxillary bones into the Throat, & into the Velum Pendulum Palati, & in one case I found the Fissure merely in the Velum Pendulum Palati. It is rare that we observe such fissures in the under lip, & yet to assign the Cause is no easy matter. The lower Jaw like the upper generally consists of two pieces, but take the fact tho we are not able to account for it. in some cases instead of one fissure there are two, when it is called the Labium Leoninum, that appearance being more frequent in the Cat kind. The inconveniences are evident, it hurts the pronunciation of several of the Letters, it is inconvenient in Chewing the [illegible] food, & more especially in Sucking, as Children can't

can't grasp y. nipple w. y. lips so as to exclude the air. Now if sucking is prevented, we ought to do the operation early, but if the Child can such, which it generally can, as y. sides of the lip are glued down to the Gum, we ought to delay the operation till the Child is weaned.

We can always before hand determine whether the Operation will be successful, only a sufficient looseness of parts is necessary. If we can bring the sides of y. fissures together, we may undertake the cure of both at y. same time, but if the Lips do not allow a sufficient extension, we cure one side before we attempt to cure the other.

The cure consists in making the parts raw & in keeping them contiguous till they grow together. some do it w. y. Knife, others w. the Scissars, & you would at first sight be disposed to prefer the knife, & certainly operations w. Scissars ought to be discarded as much as possible, but in this particular case I wd prefer the Scissars, but they ought to

haac

have short blades & long handles, to be every
way strong, so as to look (rather) clumsy, & whether
we operate w.th one hand or the other, it has
been in use to grasp the sides w.th a pair of Forceps
The Patient is seated in a Low Chair & the Surgeon stands before him
The first step of the operation is to separate
the Lip from the Gum, which we do with a
Lancet, making the separation higher than
the Fissure, in cuting off the edge of the wound
we ought to be careful to do it at the very angle,
so we ought to bring the two sides out toge-
ther sticking to each other, & I wd rather chuse
to lay aside the Forceps altogether, as they
bruise the part & hurt the Patient very
much, & we can do the operation very well
without them, with our hand. In cutting
the right side we stand before the Patient,
& for the left we stand on the right side, &
putting the Thumb on the out side, & the
fore finger on the in(side) we stretch the
Lips in the most exact manner, having
cut out the angle, & made every part raw.
The next step is to join the wound, but
before

before we bring the parts together we let it repel blood freely, & for restraining the bleeding we may press upon y. facial arteries, we pass over the Jaws near the Corner, when the Bleeding ceases in a few minutes, we might unite the sides w. Bandages, & still more easily with Plaisters, but why by trusting to either should we run the risque of being disappointed in y. cure, we might fail in every 3d. Case, & our chance comes to be worse than at first, the Lips not being so loose as before, we might join them by a common Suture, but if it does not answer the purpose fully, we can more alter it readily, so the most common method of operating is the best, the passing a pin thro the Lips, & twisting a thread round it, & I have made the addition of steel points to the pins, made like a Trocar, & made to screw off, in fixing the pin there is some nicety, we lay the lips together accurately, for the smallest deformity of the red part is observable, & we pass the first pin thro y middle

of

of the lip, or rather a little deeper than the middle, lest the saliva getting in prevent the Cure. we pass a second pin very near to y^e^ upper Corner, least a Fistula should remain there, & having no farther use for the steel points, we take them off, in other cases a single suture wo^d^ be sufficient, but here we make 2, if not 3, we have a thread for each Pin, but one thread will never serve for all, we apply it to the undermost pin, lay the sides accurately together, & secure that first, then drawing together the sides above, we in like manner secure the other, & wherever we observe the lips do not join accurately, we can bring the Sutures over that part, & having made as many turns as are necessary, we tie y^e^ thread & cut it away, & there is no occasion for making a Running knot, for we can cut off one thread & apply another, now not contented with this I have caused be added a couple of Plaisters which are applied to the cheeks & joined by Threads, by which the

the cheeks are supported, & the stress taken off from the pins. Some, as LeDran, have directed to take out these in 24 hours, but in all the cases that I have seen, they were left for a week or so without any sensible inconvenience, and viz. the certainly by. by. sides are almost, or altogether united.

The same kind of Operation will apply to every other Fissure, so when the upper Eye lid was cut viz. a knife, I caused a similar operation to be done, only I preferred the common Suture, made two or three stitches viz. a round needle, & covered both Eyes, by. the motion might not draw asunder the edges, or after a Cancer of the Lip, which is by no means an unfrequent complaint. If the Cancerous part be large it is a common piece of Dissection. The only remark here is that you will observe appearances sometimes like a Cancer, when the complaint is not Cancerous, but can be cured by Mercury, at the same time we often meet with real Cancer here, where neither Mercury nor

nor Cicuta have any effect, & elderly people are especially liable to this, & the lip becoming loose then, it is advantage that a part be taken off from it, & we find if after they are removed, Cancer in the Lip are not so ready to return as in the Breast.

Lecture 108th

At this Muting I shall explain a number of lesser operations upon the Mouth, Nose, Throat Ear &c. Surgeons have Instruments for opening the mouth, what they call Specula Oris, but except in a very few Cases such Instruments are of little moment, they may be proper if a person is insensible, & the mouth closely shut, as if we mean to pour liquor into the Stomach of a Drowned person, but if a person is sensible it is in vain to use them against his will, as he cannot manage his Tongue, but if the Patt is willing to allow the mouth to be opened, as for Lancing the Throat, but is afraid of starting, they may do tolerably well.

Next

Next I show you the Lancet for y^e Throat, we might Lance y^e Throat w^th any sharp pointed Instrument, but w^th y^e risque of wounding y^e Tongue, so to prevent any such danger Pott has contrived a Lancet w^th a Canula, which is thrown back w^th a Spring, & to regulate the depth my Father has added holes into one of which you introduce a pin, & it serves for a Regulator, so applying the end of this Instrument to the part we mean to scarify, we prop down the Lancet, & having gone a sufficient depth we let it go back again with the Spring, so this is an Instrument of great use, and may be employed w^th different views. Sometimes the Throat swells very gradually so as to be in danger of suffocating a person, & after the Swelling it is disposed to suppurate, & we attempt to prevent the Suppuration by scarifying. Or suppose that some may think the Remedy worse than the Disease, yet if the Swelling is such as threatens Suffocation, we ought to draw blood from the part

part. Next, after matter is formed in the Amygdalæ, before it makes its way out, it is sometimes in danger of slipping the larynx, so here it is proper to give a discharge to the matter as soon as you feel a fluctuation of it, as by remaining it destroys more of the sound parts. There is a 3d Case in which it has been used, where a part of the Throat has mortified, which sometimes, tho rarely happens, in order to cut thro' the Eschar, that the Putrid parts may be more readily thrown off from the sound.

The next Complaint or Operation I shall speak of is that in consequence of the Frænum Linguæ being too short, when Children are said to be Tongue tied, the point of the Tongue is drawn too close down to y. Jaw, which prevents the Child from wrapping the Tongue round the Nipple in Sucking, & drawing it far enough back into y. mouth to make a sufficient void. It may likewise prevent from pronouncing some of the Letters

Letters so readily, particularly the hard C & G, as in come, go, pronouncing them turned, do, these letters requiring the Tongue to be turned much farther back into the Mouth. The Operation is perfectly simple, the only nicety lies in avoiding the Ducts & the inferior maxillary Glands, w^ch^ operate the side of the Frænum, & are closely joined to it, so we cut the Frænum higher than the Ducts, between them & the Tongue, an assistant stands behind the Patient, & puts the 2 fore fingers into the Child's mouth, holding the head, & raising the Tongue with them so as to stretch the Frænum Linguæ, then we make the Cut with any Common knife or Bistory, or to be less in danger of wounding the Tongue we take a sharp pointed Concave edged knife, & running the point thro' the Frænum we draw it towards us or as that knife is an ugly weapon within the mouth, let us take the split metal Scissars

mr Wood

mentioned by Petit. It is alledged by Petit y.
the Frenum Linguæ is on the other hand some
times so long, y. y. Child throws the point of
it back into the Throat, & being seized with a
Convulsion in that situation is suffocated,
& that he has saved the Child's life by thrust-
ing his Finger into the Throat, & forcibly
drawing it back. So you ought to have this
in view as a possible Case.

The next Complaint we shall consider is y.
Rana, or Ranula, or Bronchocele of some, or
of others the Hydroglossum. Now by this
Complaint which is called Rana, because
from the size of the Tongue the person croaks
like a Frog, you are to understand a Com
plaint which happens frequently a very
swel
ling almost always in the place of the Infri
or Maxillary Glands, or between y. Glands &
the end of its Duct under the Tongue, for the
most part on one side only, & it is totally
different from the Bronchocele, or what in
English is called the Mumps, or in this
Country

Country the Branks from the swelling around the Jaws, now I will not pretend to say that the Disease constantly depends upon one cause, but I've seen it successfully in 10 or 12 cases depend upon Stones in the Inferior Maxillary Gland in its Duct, generally at the very mouth of it, but not always, as in this common to all other Ducts, is contracted at its orifice, so a Stone beginning to form by the Saliva is stopped only when it gets forwards to the orifice of the Duct, but in other cases it grows farther back, & we may distinguish the Stone at least one Inch from the beginning of the Duct, the Saliva flowing along the side of it, but being in some measure stopped there is a real enlargement of the solid part of the Glands, w^ch grows not only biger, but harder than is natural, the Duct in like manner comes to be distended, & I suspect may even be burst. Now where the Complaint depends upon Calculi the Cure is perfectly simple, we merely make an Incision upon the Stone, & extract it, observing

observing only the exact situation of the Duct of the Gland, that it is just between the sublingual Glands & the Tongue, & you next recollect that the Incision ought to be made at some distance from y. point of it, the Sublingual Nerve entering there, but the Duct is generally more superficial than the Nerve, so we can divide y. upper, & thin part w.t safety, & turn out the Stone, & the Surgeon need not think of stopping y. hole, it is not in his power, but the Orifice contracts gradually, I doubt if ever it heals altogether, but the Duct comes to have 2 orifices in the mouth instead of one, by the slanting division however of this new orifice, the food & drink do not get into it: before I discovered that these Stones was so frequently the Cause of this Complaint, I saw 2 or 3 Cases of considerable Swellings here, & followed the common method of making an Incision, I found the Bag filled w.t a Saliva, the Salivary Duct having burst, the person recovered quite well, a Granulation succeeding, & making the Cure.

En

in these cases the Stones might have tumbled out into the Cavity of the mouth & not been observed, but except in the Duct of this Gland. I have not seen any Stones formed either in y. small Ducts of the Sublingual, nor in the Parotid, tho a larger Gland, but from y. Cylindrical shape, & the firmness of its sides there is not time given to the Liquor to stagnate till a Rudiment is laid, wch being increased by attracting the Saliva. I've observed that the Incision of this Duct is no material Inconvenience. — But an Incision of the Parotid Duct must have a very different effect, where it is divided by accident, or in performing operations, or where the Gland grows Scirrhus, & we must cut the Duct, you cannot expect to unite the divided sides of the natural Duct, it is too small to admit of this, hence the Saliva runs along the face in a very disagreable manner, so we must form an artificial duct to supply the place of y. natural, & this is very practicable.

The

The French have proposed the making a slanting hole, and a red hot Iron in order to render y. sides callous, but no material advantage is obtained from acting in this manner, as the sides will soon grow soft again when the burning throws off later than this my Father proposed in the Med. Repository to pass a Seton in a slanting Direction, and keeping it in till the passage grows Fistulous to draw together, the sides of the Wound, but I shall shew you a method somewhat different from this in wch I succeeded to M. Wood, in one case I took a Couple of very small threads, put them round a Bougie, & making a perforation with a perforator, I put the Bougie in and allowed it to remain 2 or 3 days till it had made the passage Callous. I then had contrived for the purpose a small Silver pipe, the length of the artificial Duct, I put y. end of it on the Bougee within the Mouth & pushing back the Bougee, & carried the thread with me to fix the Pipe, till the wound in the Cheek should heal, & having removed y. Bougee the Silver Pipe was left in its place, & to keep it up it

it there I laid in a little bit of lint & tied the
Threads upon it, & closing the Lips of the Wound
The Saliva run from the Duct to the Mouth
w. a thread, which was healed in 2 or 3 days. I drew
out the pipe, & the Saliva preserved the Duct open
It is now 6 years since the operation was
done, & the Patient finds the artificial Duct
to answer just as well as the Natural one
It often happens that after a Suppuration
of the Parotid Gland, the small Ducts by the
Separation are divided, now in this Case it
would be imprudent to attempt the Opera-
tion, as we would wound the body of the Gland,
& put an Instrument so far into the Cheek,
but if the opening is in the inside of the Duct
only, we may try the effect of a slight touch
of Caustic, as the parts may have grown
fistulous, after that we may try Compres-
-sion, & secure the Dressing by Adhesive plaister,
but generally we will fail, from the whole
branch being cut thro; & wherever a small
branch is concerned, a considerable quantity
of Saliva runs out in the time of Chewing
Eating

but it is not attended with great Inconvenience, & with time the wounded parts of the Gland will shrink, & the flow stop altogether, as I have seen happen in the extirpation of the whole, or a part of the Parotid Gland in a Scirrhus state. I have had occasion to treat 4 cases of this sort: in the first the whole Gland was Scirrhus, & might soon have become an open Cancer, we therefore extirpated the whole, & as with that Gland the Portio dura of the auditory Nerve was in great measure divided, it was followed by a degree of Paralysis of the side of the Face, & particularly of the Orbicularis palpebrarum, in the Operation there is nothing to be observed further than that the arteries spring from above as well as below, so must be taken up, where the Surface only grows Scirrhus we may avoid the Portio dura, so that there will be no sensible Paralysis of the Face. Now in some of these cases there was a good deal of oozing of Spittle along the Cheek, but gradually the Gland

gland shrunk, & the skin was closed.

We shall next suppose that some substance has stuck in the Throat, the danger of its shutting the Larynx has been already mentioned but suppose it to go farther back into the Oesophagus, we remove it by an Instrument, a piece of Whalebone, & a piece of Sponge at the point of it, but we must tie a thread to the Sponge, lest it slip off from the Whalebone & with this it is pressed down to force the substance down into the Stomach, & when the Breathing is straitened there is a necessity of doing this, or of suddenly cutting it out, but before we thrust it down we would keep it in the Throat a good while, & by irritating the Throat, to bring on repeated Efforts of Vomiting, for that is the easiest, as well as the safest way to discharge it, for the substance may prove dangerous by stopping in the passage, drawing other substances to them & forming balls, and once they have got into the Stomach we may

may give over thoughts of throwing them up by Vomiting, but if the Substance is such as will dissolve, as a bit of meat, we would not use force, if the Respiration is free, because the Throat in common with the Stomach possesses a Digestive power, at least after 24 hours I have known them go down with ease, & perhaps more than Putrefaction takes place. Next where the Substances are large, & the breathing straitened, we use the Instrument with more Caution, as we may push the Substance more into the top of the Trachea.

Next suppose the Substance is such that it is dangerous to thrust it down, & that we can't easily in that manner get hold of it, we have one curious Case of this kind by D. Hoghorn, where a feather stuck in the Oesophagus, the method he took was a-bundantly simple, he introduced a Whale bone with the threads tied to the Sponge, and twisted round he entangled the feather & brought

brought it away, others propose to use a Wire, but that is attended with more danger.

Next suppose that the Asophagus is Constricted from Disease, which happens frequently, we have 10 Examples of this in a Pamphlet published by Dr Haen at the Hague, de deglutitione laesa. I have met with six. That Complt comes on generally without any evid[t] Cause tho not always, so it may depend upon Lues Venerea, which in a particular manner attacks the Throat. the Asophagus is partly Constricted the Coats of it thickened, & partly it is filled up by a spongy kind of flesh that grows out from it. The thickened part may become as hard as Cartilage, which when there is joined with it a sort of Fungus, so there may be a Cartilaginous Ring near the Stomach, w[t] Spongy flesh acting like a Valve, so that the Pat[t] swallows w[t] difficulty, but can Vomit with Ease. Now we can generally judge of the place which is Constricted by observing the Patients Throat when he

swallows

swallows Drink, when we see it swell out,
& the Patient distinguishes it himself by the
Distension giving pain to a particular part,
tho' he is in danger of referring the pain to a
wrong place. Now with respect to the Cure,
some persons have been Cured by a Salivation
w^th Mercury, which is one of the most likely
means by way of Medicine, but little to be
depended upon. I have tried it in 3 Cases, but
to no purpose, it is worth your attention to
attempt some Mechanical relief by Operation,
Life at least may be protracted by using
means to dilate the Oesophagus, as in Stricture,
so here Bougees may be of service, & they may
be endured when passed from the Nose, we
may contrive too a flexible hollow Tube, w^ch
will answer as a Bougee, & also serve for
feeding the Patient, for many have died of
absolute want, not having received nourish-
ment sufficient for continuing life by
Clysters, tho' these were often repeated, so by
degrees we could enlarge the size, & load
them

them in the erect posture w. some pond'rous substance, which would work its way gradually in dilating the passage, & the Instrument being well oild is passed down till it is mechanically stopped, & we come to know the very place. Now suppose the Stop in the passage is not to be overcome, we are treating a desparate Case, so we would try a dangerous remedy, I would open the side of the Osophagus to cut out the Contracted portion, it is possible to avoid cutting the vessels & Nerves, tho' a danger attends every deep wound here.

Next, as Custom has introduced every observed method of wearing Ear rings, we ought to put in these in the most easy manner, for the Silver Smiths by using blunt Instruments occasion pain & even Inflamation which may prove dangerous, so I have seen a swelling of an Erysipelatous nature occasioned in this way extend behind the Ear. Dr Lind has contrived a very proper apparatus

a

a Lancet which enters into a Canula, & we sup-
port the Lobe of the Ear w. a Fork, into w. we re-
ceive the point of the Lancet, which is followed by the Silver Cagula
we then introduce
a bit of Gold, or bit of Leaden Wire to render
the open Callous, & the Operation is finished.

Next I would observe w. respect to y. Ear,
that y. External passage has been supposed
to be more Crooked than it is in reality, and
yet presenting the Ear to the Sun, we can see
the membrane of the Drum distinctly,
drawing back the Lobe, & bringing it into
a streight line with the Osseous part, so that
in this way we are able to learn the Cause of
Complaint in the Ear, as of Pain, Suppuration,
dullness of Hearing, or the total want of it,
which may proceed from a variety of Causes,
some of them not discoverable, as lying
deeper, but in other Cases they may be ow-
ing to an Inflammation of the membrane,
& a hole in it from which the matter is
discharged. In others again we find Flesh
granulating round the hole, or of the
greater

greater part of the passage perhaps filled with it, in other Cases we find Polypi in others again Erosions, while in other Cases there is a difference of shape, now as we can then get to the bottom of the Ear, we would lay aside a method which has been proposed of making a Cut behind the Ear in order to get into it, or suppose that a foreign Substance has got into the Ear, we extract it by a pair of Pincers, or a small Screw, as in the Case of a Bea, or in this way we kill an Insect, or we may kill the breathing Insects by filling the Ear with oil, which will stop their breathing pores, but for the most part the dullness of hearing depends upon Wax Collected in the Ear. Most people suppose that if they have Wax in the Ear, all is well, but it is merely a defence to the Ear, & when collected in too great quantities occasions Dullness, & several Surgeons have been affronted by ignorants not attending to these Circumstances, at the same time we are not to remove it by the force of In-

jections

Injections. Dr Haygarth has shown that Water is the best Menstruum for it, & we do use the Syringe for to throw in water to soften the Wax, or to wash out what is loose, but we bring away any hard substance by a probe introduced.

Next the Internal Meatus or Eustachian Tube may be sometimes in fault. it has been proposed to throw Injections into it, but we can expect very little benefit from this, suppose that the Labyrinth is inflammed, well the squirting of water against y mouth of it remove the Inflam.n we might as well think of curing a Catarrh, by squirting water into the Nose. I know however that this can be done with no great difficulty by means of an Instrument bent to the angle w.h the Tube makes w.h the Nose, we turn the point downwards, & turns it along the Septum to the Nose, till you get into the Throat, when we readily direct it into the mouth of the Eustachean Tube. ——

Suppose

Suppose next y^t. this Tube is altogether shut as where a Polypus in the Throat has continued a long time, & brought on a dullness of hearing which remains after the Polypus is removed, we might in such a case conclude that the Eustachean Tube has been shut, & to make the matter more certain let the Patient expire w^t. all his strength, stopping the mouth & the Nose, & observing if he feels a Crackling in the Ear, & a pain owing to the air stretching his Drum, & if this is altogether wanting, we may presume y^t. y^e. Tube is shut, now in such a Case we may introduce a Tube, and bring it near to the Eustachean Tube, & thro it entering a pointed substance, we make an artificial opening, then with drawing the Perforator, we would introduce a bit of Bougie The attempt is not dangerous, but suppose that we fail, or y^t. y^e. end of the Tube is altogether wanting, there is one project that I've thought of, that as the Cells of the mastoid process communicate w^t. y^e. Cavity of the

Tymp

Tympanum, & y. use of y Eustachean Tube is merely to convey air into the Internal Ear, we might admit the air thro' y mastoid procefs, preserving it open by a bit of Silver tube.

Lecture 100th

At this Meeting I propose to explain the Surgical treatment of Tumours situated in y. Cavity of the Body, to which however a Surgeon can have accefs, as in the Rectum, the Vagina the Mouth & the Nose, the Throat the Pharynx & Oesphagus. I think it best to save repetition to consider them under one view, both y. the Method of operating is similar, & y. y Tumours forming in these places approach more nearly to each other than is commonly imagined. Guidea observed a sameness of Structure in all the membranes y. line these Cavities, & they all separate mucous in large quantity, & comparing the several Excrescencies, we observe a great resemblance, some things however are special, & therefore

I shall make a few remarks on Each. I shall begin
with the Hæmorrhoidal Tumours. It is generally
supposed by y. y. Vein is about y. anus becomes
Varicose, & y. Danger of Hæmorrhagy here is in
proportioned to y. size of the Tumour. Now
I am certain y. Hæmorrh resemble those we
find forming in the Throat, or in other places,
that there may be some danger of an enlarge-
ment of the Vessels. I would readily allow,
but seldom such as we can discover or de-
monstrate by Dissection, & where y. Tumours
bleed largely, or swells suddenly, this hap-
pens in the same way as where a Polypus
within the Nose bleeds largely, there is an Erro-
sion or rupture of the Vessels, & if the Tumour
has its Vessels eroded within its substance
it is covered by a tough skin, that is a consid.
in case of size from y. Effusion of blood,
not from the Dilatation of Vessels, but
there was first a Tumour or solid substance,
an Excrescence, & in consequence of this Ex-
increasing & some of the parts being eroded,
there

there was blood Extravasated, but I do not find
y. we can prove in any instance y. y. Veins
about y. Anus are gradually enlarged to
a Varicose state, but there is merely such
an enlargement as happens in every part
of the Body where Tumours form. perhaps
more readily here because of the office of the
part, the nature of the contents, the Irritation
of these, the accidents from sitting on y. part,
& the effect of the unequal distension of the
Rectum, wch occasions Tumours more frq
uently here & more readily dispose them
to blood when formed. Now if that Idea be
established I apprehend it will alter very
much any opinion we may form with
respect to the utility of persons having
such a complaint, from its removing
other Disorders, & that we may as well
congratulate one for having a Polypus
growing within the nose, as in having
such formed within the Rectum, both when
formed, & where blood for a length of time
is

his ~~has~~ discharged from them, become in
some measure useful to the Constitution.
A Plethoric Constitution is gradually
introduced, but we would check the be-
ginning of both, & tho' I am ready to allow
that in many persons the Constitution is
disposed to prepare more blood than
is proper, & yet such persons ought
to be obstem.t in Diet, & promote the usual
Evacuations, or Nature will seek out
some safer way of freeing the Constitution
of its load & Humors! Tumours, besides frq.
uently discharging blood in great quant.y
freely by being exposed to Irritation, they
give occasion to Fistulæ, & are apt to de-
generate into Cancer, wch makes its way
into the Cavity of the Bladder, or in Women
open a Communication betwixt the Rectum
& Vagina. I am therefore much inclined
to believe that Operations in consequence
of Hæmorrh.ds should be more frequently
than they are, for I know that we can

Stop

often eradicate them entirely, can perform an operation, not without pain to the Patient, but without material Danger, & free the Patient in a few days of a complaint that has tortured him for years. In one of these I shave with a small Pedicle & tied a bit of thread about the root, & took it off w. a pair of Scissars, in another as the Basis was considerable, a double ligature was passed thro the root w. a Needle, & tied on two sides whereby it was removed in a few days, but if we cannot remove them, or if they occasion so little uneasiness that the Patt. is contented w. palliating the complaints, we do so by avoiding what fills the Vessels, or heals the body, keeping the Belly easy & promoting free Perspiration, so a flannel shirt will be of use in such Cases.

If the Tumour is in a deep cavity we draw the thread streight by making a resistance beyond the Tumour upon one of the Threads.

In

In a similar way we can remove with a Ligature other Tumours, as too large growth of the Amygdala, this however is seldom necessary, as by Medicines, attention to Diet, Exercise, & trusting to the operation of the Constitution, they will generally gradually subside, but if they enlarge so as to straiten Respiration & Deglution this is one of the best Remedies, having first lessened the bulk of the Tumour by scarifying. In like manner we treat Tumours forming in our Uvula, & I shall now give you a Case where the Uvula grew Scirrhus & Cancerous, & look-
ed so large that on inspection we did not use the precaution of a Ligature but cut off the Tumour down with a pair of Scissors & left it bleeding upon the taking it off. with a pair of Scissors there was little blood for some hours, but when the faintness from the terror had gone off, it bled most violently, & to such a degree that I imagined the Patient gone, & we could not stop it w.th the Potential or actual Cautery till the Patient fainted from the loss of blood, when the bleeding ceased & did not return

so

so that in such a case you may avoid this danger by introducing a double ligature, & tying on both sides of the Tumour.

Next w^ch respect to the Polypi forming in the Vagina, these in broken Constitutions are apt to grow Cancerous, but generally they are soft, & tho' in extracting them, a root should be left & the Tumour grow again, I do not find they are much disposed to grow into Cancer

Next w^ch respect to the Tumours in the Nose, the kinds I've seen are first a Sack within the Antrum maxillare, & not the membrane lining the Antrum filled with mucous, & as the structure of this Sack was the same with that of the membrane, we may conceive it possible for similar Tumours shall sometimes form in the nose. Next within the Nose, & w^ch from an erroneous Idea w^ch reg^d to them are called Polypi, have generally this kind of appearance. at first they are of a whiter colour than the natural

natural Membrane of the Nose; very often, especially in Children they are semi transparent, resembling a bag filled w. gelatinous matter, & the bag is painted w. numerous Vessels & conveyed blood, by degrees the same substance grows firmer & of a darker Colour, it increases in a gradual & uniform manner, so as to fill the nose, tho' in some Constitutions it stands still for a length of time; & I would observe w. reg. to such Tumours, that tho' Irritated by sharp Substances, by astringents, or by Caustic Medicines, or attempts to extract them improperly &c. tho' they are dispos'd if the root is left to grow again, I have not seen a Case where the Common kind in a Constitution otherwise sound, degenerated into Cancer, they return nearly to the same appearance as at first, but in Elderly people where the Constitution is broke w. Venereal Complaints &c. the Tumour loses its softness, becomes hard

hard & unequal, is dis posed to bleed, & if irritated & left without any operation, it degenerates into Cancer, but such Cases is very rare. There is one other kind of Tumours in y. Nose of a Cancerous Nature. I met w.t one Case where at the top of the Nose & under the Eye there appeared a Tumour like a Clot of blood, not thicker, but of a Vascular texture throughout & every part when irritated was dis posed to bleed. it corroded the bones round y. top of the Nose, & destroyed the Patient shell for ther back in the Nose where it hangs over the Throat Tumours forms, but are of a different appearance of these within the Nose, they are of a fermen consistence & appear uniform thro' out, resembling to the fundy. body of the Uterus in a saund state.

Again, when Tumours grow out from the Oesophagus, they are more of a Spongy texture, unless perhaps there is a degree of Ossification or Cartilaginous Structure, compleated w.t the Excrescence & have not

med

met w^th an Example where Tumours forming in the Pharynx or Asophagus have either spontaneously, or by Irritation grown Cancerous.

Now so far of the Nature of these Complaints I have already mentioned in general the treatment of Hemorrh^l Tumours. It is now to consider the treatment of those to which we have access w^th greater difficulty. I need say nothing of the effect of Medicines, for so far as I have seen they have none. I have tried Mercury in Hemorrh^l Tumours, Polypi of the Nose & other, the only effect it had was to render them more disposed to bleed, which might have been expected considering the Hemorrh^s from the softer parts w^ch are occasioned by the use of Medicine. I have also tried strong Solutions of Allum, white Vitriol, crude Sal Am^c without any sensible effect. If we apply Caustics or make a greater impression, so as if the Tumours is small, & soft, we may succeed, but if hard it makes little impression in proportion

If

of the Pain & inconvenience attending it, for as fast as one Eschar throws off, a fleshy Substance grows beneath it, so that after some Weeks it is as large as before. It remains then that we attempt to extract them by Instruments, & here there are three wide ond Methods which may be attempted. The cutting it w^th a knife, or w^th Scissars, we use knives of different shapes according to y^e Situation, as the Common Dissecting Scalpel, the straight Probe pointed knife, or a Concave Edge'd Pointed knife, or we employ Scissars of various kinds, adapted to the shape of the parts, at the same time I would advise you to use these Cutting Instruments very seldom. It is surely preferable to tie y^e root of the Tumour, because we stop the bleeding, nay we can go deeper w^th y^e Ligature than cut with the Scissars, & few cases will occur where you can reach the bottom of a Tumour with the Knife or Scissars, where you can't apply a Ligature to it, so I would have the

the knife or Scissars in reserve as our last resourse, & direct our attention to the putting on of ligatures, which we may do in a variety of ways. For puting the knot in deep seated Tumours we wild use the Ring of Hildanus, & use a bit of Catgut for our ligature, which being strong & full of oil does not rot readily & it should be generally past twice, making what Surgeons call their knot, & by making the Ring of Hildanus with a bent stalk, we can conduct the Thread to the bottom of the Tumour in the Pharynx or Oesophagus, or if that cannot be done during the time the Patient can keep from breathing it may be necessary to perform Bronchotomy, a double blow pipe is also used by Surgeons for making knots, particularly Leveret has applied this Instrument to a Silver wire, that is very flexible for the extirpation of Polypi within the Vagina, & the same method will apply to Polypi in the Throat,

contrary

contrary to what he has supposed passing the Instrument thro' the Nose, when y^e Silver Wire or Catgut is in the Throat we lay hold of it w^th the fingers put into the Mouth, and push it behind the Tumour, then pressing down the Instrument on the Tumour we allow it to remain, securing the Ligature, & generally in 3 or 4 days it will break thro' without the loss of much blood.

Next suppose a Polypi far up in y^e Cavity of the Nose, where we cannot get y^e root w^th the ligature, we choose a clear day, in y^e time of that operation, we may see y^e root with the light of the Sun, we take hold off y^e Tumour w^th a small pair of Forceps, so as to stretch it, that the Surgeon may conduct the extraneous Forceps near to the root, (see a figure of them in Sharp) & it will generally be got away near the root, w^ch is narrower than the rest of it, we then introduce a piece of Haustic into the Throat w^ch a proper Conductor, or suppose y^e by touch

touching the ~~last~~ Root with Caustic, you can stem the Blood: or suppose y. a Violent bleeding of the Nose occurrs from any other Cause, Le Dran has suggested a method which is very practicable, the stuffing the nose before and behind to prevent any more blood from being discharged, then fills the cavity of the Nose, we introduce a Catgut thro the nose to the Throat, pull it out at the mouth, & take a piece of ~~strong~~ Tape dipped in some Plaistery substance forming an oval about the size of the last joint of the Thumb, wch. y. Finger we direct this into the Throat, & pull it into the back of the nose, then pulling another piece into the nostril, we pull them strongly together.

I mentioned the other ~~day~~ a Stricture of the Oesophagus, now we may treat that as we do a Stricture of the Urethra, by Bougies passed thro' the nose, or by such Tubes ~~&~~ made hollow, we could convey ~~Tubes~~ nourishment to y.

Patient

Patient, or suppose a Sumour dup seated in the Oesophagus, we would pass a wire thro' the Nose into the Oesophagus, then let the Patient make the effort of Vomiting, & having opened the wire into the Throat, and passed it dupon when the Patient again swallows the Sumour, it will carry the wire to the root, & will wear its self thro; or by passing a flexible tube into ye Throat we can straiten it about the root, tho therefore the Sumour be as dup seated as the Stomach we may remove it in this manner

Lecture 110th

I next propose to treat of the Trepan, as I formerly spoke of Wounds of ye soft parts of the Head, it now remains only ye we consider the effects of accidents upon the Cranium, with the Method of remedy in these by Surgical operations.

10th

1st where a Blow is given to the Head, the Brain & Cerebellum are affected by the shock, or as Surgeons speak, by the Concussion or Commotion, & the effect in this way may be highly dangerous, & even fatal. i.e. a Person by a shock of the head any how given may be killed, & yet in the most accurate Dissection the Cause of the Injury is not discoverable. Now this is at first sight very incredible, & yet a little reflection will lead you to believe it, you have heard of persons being knocked down, or stunned by a Blow, & remain insensible for a few minutes, & yet after that time they recover perfectly. Now we more easily conceive a person should die by the blow, than if he should remain a few minutes insensible, then recover perfectly.

In like manner a Person is killed by thunder or a stroke of Electricity, without any sensible Injury being done to the Brain, or when a person falls from a height, tho' if head is not struck, the Brain may be disordered.

Read

next, in consequence of the Shock or Concuss.,
without any fracture of the Cranium, the Vessels
within burst & pour out their Contents, or Con-
cussion is the Cause of Extravasation. We may merely
from Concussion, or Inflammation & its sequale,
Suppuration may be produced, the Shock irritat-
ing the Brain & throwing it into an Inflamed
state, & tho there is not an Effusion from the
bursting of the Vessels, there may be a Suppuration.
If there is an Effusion, we will understand how
the Suppuration will more readily happen,
that the burst Vessels will inflame, & if Serous
part being effused, this by the heat of the body
& the Inflam.n together may be converted into
purulent matter, & the last effect will follow
sooner or later according to the nature of the
accident, the Violence done to the Constitution,
the quantity of Liquor effused, the treatment,
I've known a Suppuration gain'd in less
than 48 hours, w.ch was evidently the Cause of
Death, & in Morgagni there are not fewer
than 8 or 10 Examples of the same thing.
J. In

without any fracture

next in consiquence of extravasation

In other Cases the Suppuration forms much more slowly, matter forming in several Months, nay in several years after the accident, in two Cases where a Suppurn was found in y^e Brain, it could be traced from Violent blows given to the head, in one Case 12 & in the other 20 years before, & during all that time they were subject to headachs, Epileptic fits, pains striking down from the head to the back, sometimes a weakness of Limbs, & these coming on in an irregular manner. So an Operation may be necessary where Matter forms in consequence of any sudden accident, or where it forms spontaneously, or where it forms after the Patient has laboured under some particular Disorder, as the Lues Venerea, Scrophula &c but even when no known Disease is observed in the Constitution, Collections form in the Brain.

Next the assistance of a Surgeon may be necessary on other accounts, & where y^e effects of the assistance is more obvious. In Child^n the

the Skull is not only tender, but much thinner than in an Adult, & hence it is very generally believed that it may be depressed without being broke. Now I will not dispute the mere possibility of this, but it is a rare incident, because in the youngest Child the bone has a considerable degree of brittleness. this notion has taken its rise from a circumstance you ought to be warned of, that where in consequence of a blow the Teguments swell out, a person who had never been told, would imagine that he felt an depression the part yields in from the humour diffused in the Cellular Substance, and one thinks that he feels the bone regularly depressed all round the Tumour. In an Adult it is universally allowed that depression cannot happen without fracture.

We next suppose the depression in consequence of a Fracture, that a piece of Bone is depressed inwards, it is evident that we ought to raise it to its former level. For a small Straitning of the Brain made suddenly pro-

duces

produces the most dangerous Symptoms.

Next without any depression where the Skull is broke, & fissures formed it will be a general good rule to apply the Trepan, for tho' I am far from alledging y.t y. operation is without danger, yet y. danger arising from a fissure exposed to the air is nearly the same as when the Trepan has been applied & y. dura Mater immediately accidentally thro' the fissure, the air has & by applying the Trepan we give a free discharge and next a large portion of the Bone becomes Caries, from Causes whether External or Internal, by means of this Instrument we take out the piece, making a No. of holes one joining another in its Circumference, I formerly observed that we would never think of doing the operation in Cases of Epilepsy, as there is danger from y. exposure of y. Brain to the air, without any prospect of advantage, as to the degree of danger we see many Patients die after it is done, but we are at a loss to determine, whether the Disease or the Operation has had the

prin

principal effect; that of Death is not owing all together to the Operation is evident from the Success in some Cases. I have made Experiments upon brutes, in some I went thro the Skin and Bone only, in others I went thro of Dura Mater also, none of them were dangerously ill but when the air was admitted thro of Dura mater, the air evidently had a bad effect on the very tender membrane of the Brain; so where we are obliged to open the Dura Mater from necessity, we ought to cover the Wound carefully, laying over of Dressing some substance dipped in tough Liniment, changing the Dressings for preventing the matter from gnawing acrid, & in that way injuring the Brain. I observed the Symptoms of oppressed Brain may be produced by Concussions, as well as from Extravasation, now in the former of these Cases, the Operation only adds to the danger, while in the latter it is highly useful. So Eminent Men have all attempted to discover Symptoms for distinguishing between them. Celsus & others have treated of Subject in

ingeniously, & they conclude y. y.g. disorders from Concussion. it is immediate. the Patient is stunned immediately, but if it is from Extravasation, y. the Insensibility will come on slowly. Now this Observation is not altogether to be admitted, because one would suppose that if from a blow given to the head, large Vessels burst, the Blood thrown out will very suddenly oppress the Brain, & produce the appearance of Concussion, & I knew from several Cases in Morgagni that the very thing has happened. A Person again will receive a blow, not be much stunned at first, but afterwards grow quite insensible, & yet on dissection we can discover no marks of Violence, besides suppose the Distinction accurate, yet how do we know that the Patient may not have suffered in both ways here tho' he may recover from y. Concuss: he may afterwards be distressed by the Extravasation, so no absolute Rule can be laid down here, but we must attend to y. Symptoms

Symptoms. If the antiphlogistic method does not remove these, & if we can discover the place injured, we ought to apply the Trepan, so that I proceed now to show you the different steps of the Operation, & the manner of executing them.

The Surgeon means to cut out a circular portion of the Bone, so must have a circular saw, which you'll find was known to Hippocrates, he turns it by fixing a proper handle to it, a & twists it with our hand it is called a Trephine, & probably in the rude state of the art they knew, but when Machinery was more improved, they came to employ such a handle, as Workmen commonly uses, then the Instrt is called the Trepan, now this last is in gen.l use in all Countries in Europe, except in this Island, it is a safe handy Instrument, & we act more easily & equally with it than with the Trephine; with the Trephine we are not able to turn more than ½ of a circle, whereas in the Trepan we turn the compleat circle, or we cut 4 times as much in the same time the handle is such y.t we take hold of it

a piece

space of time. Next to be able to turn the Saw directly in a circle, there is a centre pin which we remove when the Saw is a certain space into the Bone, which we do w. a Key; & to give the centre pin to enter more easily, we have another Instrument for making a small hole. In the time of Sawing we have a Common Probe, or a pin cut for taking out any particles, & as some of these may stick in the Saw, a hard brush takes them off, & that he may not be stopped he has two heads of the same size, so that he may give one to an assistant to be cleaned, while he proceeds with the other without Interruption. After the Bone is loose he lifts it up w. a Crooked Iron, & if the edge of the orifice remain rough, we are directed to scrape these off, & to raise the depressed portions by pieces of Crooked Iron called Levators. We determine as exactly as possible the place which has received the Blow, & if there is any difficulty the whole head ought to be shaved, & this will also be of

of use by keeping the head Cool, we examine the Teguments, & we feel the bruised parts thickened, or we see them discoloured, or when particular places are touched the Patient shrinks, tho' he may in some measure be insensible. On bruising the hurt part you will observe some motion of his Leg or arms. If the Injury has been received sometime before, tho there is no hurt in the Skin at the time, very often, tho not always, you will discover the Teguments affected, as Pott says, we find the Teguments puffy where the Internal membranes are in a Sloughing state, which mark will often occur, because such an injury as is communicated to the Internal parts will affect the Bone, its Periosteum, & particularly the Periosteum or external Periostium, wch will be of a sloughing or Diseased. — they will grow thick & Edematous, but we are not to take this reason for it, that it depends upon the Communication of Vessels, merely that there are so many communicating, that if the

the Vessels on the inside are separated or burst there must be such a separation of the outer side. The inner side may be sloughing without the outer being affected of which you'll see Instances in Morgagni, the external may be puffy without any Disease in the Internal membrane, so we are not to have recourse to the Oper. from the appearance, unless it is accompanied with Symptoms of an oppressed Brain.

Suppose the place marked nearly, we wish to have a notion of the whole Injury before the Trepan is applied, & we do that by taking off the Teguments, but I would not at once cut out a Circular or Oval piece, we would first make a straight Incision near the place, & we only continue it farther, when we have seen the state of the Cranium, & we operate where the Central stroke has been given, & the several fissures come out, as here the depressed & loose piece will be found. Having thus determined the very spot for the Operation, we cut out a Circular piece w.

a

a common Scalpel as much as will allow the Trepan to be applied, without touching the edges, & it is no matter whether it is circular or not, & you ought first to take it off loosely, leaving a good deal of the membrane beneath.

Next we determine still the place on which we propose to fix the Instrument, and we endeavour to cut away the membrane from the Bone, & as the Bone still remains so much covered with membranes, that the teeth of the Saw are apt to be entangled, or to slip, we are provided w^h an Instrument for scraping the portion of the head on w^h we intend to operate. Surgeons generally do this with too much freedom, not aware of the consequence of the external membranes to the Bone, they ought to lay bare no more than the head of the Instrument will cover. The head of the Trepan is now used larger than formerly, especially if there are depressed portions, which need to be elevated. if we mean to distinguish fluids, only where there is a

fracture

fracture a small head may suffice. In order to be still more exact, we may apply the head of the Saw to the Scull, mark the Centre of it, & that we may not miss the mark we fix the handle & make a little motion that we may be sure of the place, & we might go on w.th this Instrument, but as the Centre pin would be blunted too much, we employ the Instrum.t we have for the purpose. Now most Surgeons are so anxious to get their Trepan fixed, that they cut a large hole, & the Instrument vassilates, most Surgeons put their hand to the Instrument to give it a little more firmness. If the Saw sticks that will be generally owing to some of the pieces that have been sawed off, sticking between the Teeth & sides of the Saw, & we are not to think of getting the better of this by main force, but we turn the Saw back a little to disengage it, when we can work with ease. You recollect the different Cautions I gave when treating of the Cranium, some speak of a want

want of resistance, & the Savings turn of a
under Colour when we get to the Deploe, but
in many the 2 Tables of the Scull are compacted
so much, that these marks do not hold,
so the only good rule is to take off the
Saw very frequently, & to examine y. depth
we have gone. Formerly the Saw was used
Cylindrical, then in the days of Paro they
were made Conical to prevent the Saw from
falling in upon the Brain, of late years
again this shape has been properly laid aside,
as entering more slowly, & they have sub-
stituted the Cylindrical Saw as a great im-
provement, we are told farther by Sharp,
that we left out more exactly the piece
with it, but this shows that he continues
sawing too long, & I propose as a material
& real Improvement, that we should
never think of cutting thro' y. bone entirely
with the Saw, for the Instrument is in
danger of plunging into the Brain, and
when it is brought to Vacillate, we can
readily

readily nap off the piece. If little Specula remain these do not press against the Brain, & we can easily take them off, nay there are not more left in that way. For we break the bone without intending it, and then we are more in danger of doing hurt. For besides the danger of plunging in upon the Brain, you recollect that there are a number of Furrows, or blood vessels, & cutting thro the pieces we divide them, whereas by snipping it off, we don't divide them, so that in this manner we can work with safety over the Sinuses, & tho we have an Example in Chirurgery where y. superior Longitudinal Sinuses were opened, and the Patient recovered, this is a very hazardous Experiment, especially if the wound be at the back part of the head where these Sinuses are larger. A Writer in Germany has made Experiments on purpose, & he found that general wounds of the Longitudinal Sinuses in quadru-

peds

Quadrupeds provided fatal, the best way of lifting up the pieces is to put a pointed Iron at each side, instead of Forceps which are apt to slip. Neat Surgeons are provided with an Instrument for scraping the sides of the hole, which has a Cusp for receiving the scrapings, but this enters within the head, & bruises the substance of the Brain, so we use in place of it a flat very thin body which slips in without any great danger. Now we need not be anxious about the Operation, it is perhaps not at all necessary, but to prevent Reflections for leaving the sides ragged, we go round carefully, which we do without detaching the Dura Mater to any sensible distance.

I am next to consider whether Blood or matter is beneath, we first raise the depressed piece of the bone, & then give discharge to the Blood. We have for this purpose pieces of Crooked Iron, but they are used very improperly. The old Surgeons made teeth in their back

to

to prevent their slipping in. Now we do not know if the side on which they are intended to rest are sound, so the Surgeon introduces the point of the Elevator beneath the depending portion, & puts his own finger between it & the other side of the hole which he raises it, so that while he raises one side he does not depress another. I would next propose that if it is very loose, it should be quite taken away, whilst a piece of bone tho' cracked has connection w. the Cranium without, the Dura Mater within, it will fix in its place, but if it is loose we take it out, if we find considerable resistance we are not to draw forcibly, but on examining we shall find some corner confined by the neighbouring edge of the Bone, then introduce two Elevators & raise it equally. If next Blood or matter is confined, we open the Dura Mater w. a lancet, and we ought not to do this in a concealed way, every operation of a Surgeon ought to be

open

open & avoided. In opening the Dura mater we avoid its Vessels & if a small Incision is not sufficient, we can make a Crucial. Some, to have more force in raising the depressed bone, use an Instrument, the Invention of Petit, it has a rest on the sound parts, but it implies that more force is necessary than I would advise. Petit has a Screw for fixing the Levator to the rest, but it can not slip. Suppose next that we are to cut out a Carious piece, some make a No. of holes at ½ Inch distance, then w. a Turner & hammer they cut the Bridges, but if short which this gives is dangerous, & therefore we would make one cut & add within another, if neat, instead of pieces wedged in, we find a piece loose, there is no occasion for the Trepan, if the opening is sufficient we have only to remove the piece, but if a piece is beat in & fixed, & we have to apply the Trepan, we ought to lay some substance over the hole, as the board of a book

of

or some Tin. after the operation the Dressings ought to be dry Lint, & applied in a simple manner to keep up moderate warmth, and to keep out the air, but we are not to use pressure with a view of preventing Fungus according to Gooch, the danger is otherwise such that we can't venture to make it, if Fungus grow from the Dura Mater we may use freedom with it, & cut it off, or apply Escarotic Subst.; but if it is from the Brain we treat it very tenderly.

Lecture III.th

As we have now considered all Operations that are proper to the Trunk, & I am next to explain methods of drawing off part of the Circulating Fluids, I shall begin with the Discharges named Issues, which are formed in three different ways.

1.mo We apply a Blistering Substance gently prepared with Cantharides, a blistering Plaister

to the surface of the Body, & we allow that to lay on a shorter or longer time according to the age of the Person, or tenderness of the part of the Skin to which it is applied. the Head when the hair is thick requires nearly double the time that the rest of the Body does, but no great nicety is required in this respect, because if the Cuticle is separated & water collected, its continuing a few hours longer does no material prejudice, the tender Skin beneath being sufficiently protected. we continue to dress the place blistered with an Ointment composed of similar materials, but when the portion of Cantharides is smallest, & the strongest kind of Epispastic Ointment of our Dispensy is the best, the weaker kind being scarcely sufficient, with time the part becomes fungus, & spues out a vast quantity of matter, even in the hardest part of the Skin in the head, for a number of weeks the hair is here troublesome, and with time it wears out. It sometimes

happens

happens that Canthar ides occasions Swellings of the Conglobate Glands, they do so even at first, & in other persons after the Skin has been made tender for a while by the Ointment. & this may occasion mistakes in Scrophulous habits. Now in such a Case instead of Canthar ides. we may use an Ointment of ℥j. common Caustic to ℥j. Ointment, which keeps up the discharge without entering the absorbent Vessels.

(2.^do^ The Pea Issue, where some round opening substance is thrust in to maintain an Issue. One of the best places for this is at the root of the Deltoid muscle, we cut a hole for it with the Common Scalpel, or we employ a Lancet, & we make first two spots on the Skin with Ink to determine the length, then taking hold of it we run the Lancet thro. & very readily cut it. If the fears of the Patient prevent the use of either of these Instruments, we enlarge the Issue by means of Caustic. we lay on the part a piece of very adhesive plaister with a hole in it, made as hot as the Patient can

can bear it, we then fill the hole w. Caustic, & lay over it an other piece of plaister smaller than the first, that we may see it before it gets to the Skin.

3d. The Setan, because the ancients used Seta, or Bristles for the forming it, by this we understand a Cord introduced beneath the Skin, & the methods of doing are perfectly simple. most Surgeons imploy the Lancet & Probe, the Cord may be of Cotton, Thread or Silk, but we commonly imploy Cotton, we take the Skin double, & have it supported by an assistant & we may have the place marked, we introduce the Lancet thro the Doubling, withdraw it, & introduce the Cord with a Probe, or as timorous people are ready to draw away the arm whenever the Lancet is removed, & the Skin being let go it is difficult to pass a Cord, a Needle has been made for the purpose, or as this is not sharp enough, I have caused a Lancit to be made with a Stalk, & try it.

Now the openings so made are prest in the

the Pea Issue, we introduce the Common Pea, or any other sound substance that swells a little, or that stimulates, at the same time, as the unripe orange, or Curaspas apple, or Peas of Gentian made round, vas a growth of new flesh is in danger of pushing such substances out, we keep them in by force, as with a bit of Pasteboard with Linnen, the opening of the Setan is more easily kept.

Now the Blister Issue evidently may be applied to any part of the Body, but where we form the Pea Issue or Setan we avoid the Bones, the Crown, the Ribs, the course of the Subcutaneous Veins & Nerves, we avoid also the swelling bellies of the Muscles, choosing their Interstices, so it takes some attention to discover the most fit places, which are upon the whole, the knape of the Neck, for both Seton & Issue between the Ribs, where the Setan applies conveniently, in the Back we may form it Longitudinally where the matter runs easiest out.

The Pea Issue or Setan may be put in beneath a Shoulders for the seton, or between

beneath the Ribs, or in the Loins, but still better in the Extremities of the Body, in the Supercor, in y. hollow below the Deltoid Muscle, in the lower above the knee, either in the inner or outer side, but I prefer the inner because there is more fat under the Skin, & generally these applicati: ons does better in fat than in lean people being further from the Muscles, only we must avoid in the inner side the Vena Saphina, which we readily do by tying a Ligature on the Thigh before we form the Issue. Now what advantage are we to expect from the Drains? perhaps this is not all together to be explained, but there are somethings very manifest. first we draw off a very considerable quantity of the Serous part of the Blood in the form, or I might rather say changed into Pus, whereby we lessen a disposition to fatness; so whatever advantages you can suppose in certain Cases to attend discharges of Blood, as in the Hemorrh.e flux, may be applied prettily nearly to the discharge by Issues.

Yours

Next they certainly act in a powerful manner in Topical Cases, whoever believes y. cupping a Persons side for a Pleurisy, can have more effect than drawing the same quantity of blood from his arm, must suppose y. a Scton should have a similar effect; nay to prove it is so I have observed y. y. member in w.ch an Issue is formed shrinks, particularly near to the seat of the Issue. Then we must imagine that in a Case of Internal Suppuration, where there is an absorption of purulent matter, an Issue will have remarkable effect, for the purulent matter does pass by our Urine, it does not pass off so readily as thro' the Vessels that naturally discharge the Serum of the Blood.

There is one further View, tho I am not equally certain of it, that we form a new Excretory Gland; we are very ignorant of the causes of many Diseases. Physicians are divided about them, as the Epilepsy, Goat, Asthma, whether they depend in some measure on water floating on the general mass, or on a certain Dis-

disposition of the Solids, but all will agree if the Solids are influenced by the circulating humour, so such drains may have more effect than we are aware of & my Father who employed remarkable effects from them in Scrophulous Issues for 40 or 50 Years observed Cases, in-
-veterate Head aches arising from various Causes of Epilepsy, in the Asthma, & I've seen remarkable instances of Issues relieving Paroxysms of Asthma, & many have observed the relief they gave in Cases of Suppuration internally particularly in Consumptive Cases, but still we are at a loss for a sufficient number of Instances to determine us, & we must refer much to future Experience. The Effect of all the three kinds is nearly the same, & there is no such difference as many Conceive, the difference depends upon the quantity discharged, not the quality, they all discharge the same kind of purulent matter, nay the Blister Issue discharges Pus of the same kind as the others, & what is called the water of a Common Blister is the Coagulable part of the Blood.

Yr

We shall next attend to the drawing off the red part of the Mass.

1st We do this with Leeches, or we may scarify the Skin with the Lancet, avoiding the large vessels, & we may puncture the Skin with a large Lancet in a number of places, or we may do this more conveniently w. the Scarificator, or we may apply to the Temples &c and we may warm the Skin a little & relax it before we cut it, besides, if we are to use Leeches we may put them into a common Wine glass, and oblige them to fix in one place, previously touching the Skin with Blood or milk w. entices them to enter more readily, & they are the better of being kept an hour or two in a dry box. It has been said that if you cut off a tail from a Leech, it will go on sucking as long as you please, but on y. contrary I find y. the pain given it makes it quite its hold instantly, but for the most part they bleed freely enough, and we have rather to consider stemming,

especially in children where the quantity is so great as to prove dangerous. So if it is a complaint affecting the whole body, they ought to be applied where a Bandage can be put on, & a compress with a Bandage over all, or it is sometimes necessary to touch the orifice w. a bit of silver caustic. On particular occasions where we have to draw a certain quantity from a spot, we confine the animal close, & there is no reason why we shd. not apply a cupping Glass, as after Scarifying, if we want to disengage the Leech, we have only to touch the end with a little Salt, or if the Leech upon applying it to the mouth has got down into the Stomach, or if it is applied in the Case of Hemorrhoids, & has got into the Rectum, we kill & throw them out by injecting & drinking Salt water.

Next we promote the flow of the blood, by taking off the pressure of the air from that place, this has been done by sucking out the air, as long ago as the time of Celsus. He

he, by means of a Cupp &c. a hole in it, sucked it out with the Tongue, then pressed in soft wax from the mouth into the hole. now we do the same thing by means of a Syringe, on pulling the Sucker the air is divided between the Glass & the Syringe, suppose them of equal size, & pulling it a second time we obtain half of the remainder, so that the quantity in the Glass becomes at least very inconsiderable, but we may save ourselves the trouble & expence of the Syringe by merely heating the Glass, which may be done in two ways, the Glass may be laid before the fire, or put into warm water, or we may enter a small Taper within the Glass, which is better than burning Tow within, for tho' this is immediately extinguished on the Glass being applied, the Patient is very much frightened, on removing the Glass from time to time we wipe the orifice &c. a Sponge a little rudely to make them bleed again.

Now from this Method what are we to ex-pect

to expect: the reasons of employing it are,
that in many persons the Veins are so buried
in fat, that we cannot easily strike them
w^th the Lancet, or the Patient may be timerous,
we also use this method when we want to draw
the Blood slowly, but we especially have re-
course to it in Topical Complaints, we open
Vessels in the neighbourhood of Diseased parts,
arteries as well as Veins, the usefulness of
which I considered before.

Next let us consider the ways of opening
the larger Vessels, & begin with the most common
operation, blood letting that may be done w^th
a Common Lancet, or Fleam. The Fleam is
very much used in Germany & other Countries,
& it does very well in the external Jugular
Vein, where the skin is tough, & there is no large
Vessels to be wounded, & when the Surgeon is
in some danger of missing this Vein with
a Lancet, from its greater depth, being
covered in the place opened by the Platisma
myoides, but we can make the Lancet

much

in the time of the Operation, which may prove very inconvenient from the blood getting between the Vein & the Skin. We apply it an Inch above where we intend to make the Puncture, without pushing up the Skin, & pass it round twice, one turn doubling another, & we need only to make one knot. The Surgeon then takes his Lancet out of the Tea Cup, or other Dish in which the blood is to be let, & he ought not to have it in his mouth, which terrifies the Patient, & besides he is too ready in that way, & ought to wait a few seconds that the Vein may stretch fully with blood, he then opens it, bending the Lancet somewhat of a right angle, or a little wider that the Scales do not come in the way, & taking hold of it so as to have it firm, & to see the point neither holding it near the end or very near the point, but as to have the full command of it. We are directed to blood the right arm with the right hand, & the left with the left, but if the

the Surgeon finds an awkwardness in doing this, the right hand applies perfectly to both, only the artery may be more opposite to the point of the Lancet in one case than in another, but that happens to the right as well as to the left, and we would turn the point of the Lancet away from the artery. The Surgeon must fixes the Vein with the Thumb of the other hand, & with the Vein the Skin, resting his arm on the middle & ring finger, & divides the Vein obliquely, but when it is cut Longitudinally, it does not bleed freely, & when cut transversly it does not heal readily, but cutting it obliquely answers every purpose, so he enters the Lancet directly into the Vein till he sees the blood running along the side of it, when he enlarges the orifice a very little, but the point of the Lancet ought not to be raised, whereby more of the Vein is cut than the Skin, so that the blood gets beneath the Skin, the point of the Lancet ought to be the Lenth of

of motion, & the Surgeon makes the enlarge
ment by raising his hand. as soon as a sufficient quantity is drawn, the Surgeon puts
down his Thumb firmly on the Vein under
the Orifice, & prevents it from bleeding,
but sometimes it bleeds downwards, so
he puts the fore finger above, he then wipes
away the blood, & if the skin sinks in a hollow
he rolls some Lint & applies it to the orifice,
& over that a small Compress, & over that
a bit of sticking plaister, but this should
not touch the lips of the wound, as it is apt
to cause them to inflame, then he applies a
large Compress, & bending the arm to y^e^ posture in which it is to remain, he applies a
Bandage. if we want the blood to run quicker, we cause the Patient to move his fingers,
& the action of the muscles throw it out
more freely and quickly. —
If we are to do the Operation in the neck, the
Genoral Rules apply perfectly, we make the
prepare upon the Vein, some of y^e^ French
Surgeons

Surgeons have been at pains to contrive
Machines to compress it, but they are useless
& dangerous, & the Thumb is sufficient for
the purpose, we make the Patient Cough,
or we make it to Cry if it is a Child, which
makes the Vein swell. If the Operation is done
in the left side, the Surgeon has only to alter
his Situation, he takes the head of the Child
into his Breast, sitting on a Chair.

Next we are to consider the Accidents that
attend V. S. I have formerly spoke of the
Consequence that attend the wounding of
Nerves, I next would observe that Blood
gets out from the Vein without any wound
of the artery, betwixt the Vein & the Skin
occasioning a Tumour called Thrombus.
Now if this occurs in time of the Operation,
the Surgeon either strikes the Vein in
another place, or takes off the Ligature
immediately & makes a Compression on the Vein,
if from a Neglect Blood has got out, un-
less it exceeds an ounce or two, in a few
days

days it will be absorbed, but in some cases where a vast quantity is effused, there is a necessity for taking it out by an Incision in the skin, the only remaining accident is the wound of the artery & its Remedy, but I shall first mention the general way of opening the arteries. Dr Butter has wrote a very ingenious Thesis on that Subject, & where we mean to open arteries of various sizes, I have pointed out a very proper method of doing it, we have a Number of sword pointed Lancets of different Sizes, & we have blunt Lancets of the same shape. now Butter proposes to plunge these perpendicularly into the artery, making the Wound either Longitudinally or Transversely, if the Orifice is too small, & we do not draw a sufficient quantity of blood, you take the blunt Lancet for a Conductor to a larger Lancet, & you pass it perpendicularly likewise, thus you go on till you make the Orifice to your Intention, and this is necessary in Experiments on animals but

but the only artery to be opened in Diseases is the Temporal, & this was done in the days of Galen. & for doing it we may use the most common kind of Lancets. Some have tried to improve upon the Common Lancets by taking away the Shoulders of it, which is in danger of cutting the artery. some carrying this farther have made it Concave, but the making it streight answers the purpose sufficiently. now if we let blood in the Temporal artery we endeavour to bring it fully, & we prefer the anterior branch. because the Nerves are smaller, & are not closely glued to it, & we make the opening rather Longitudinal than Transverse. we find a dispute w^t. reg^d. to the stopping off^g. blood, whether merely we are to make a slight pressure on the orifice, or to squeeze the sides of it together. the fact is that it stops easier than is generally imagined, but in a few Cases it is very troublesome. M^r Butler has contrived a neat Instrum^t. for compressing it.

No 0

Now from this Operation let us return to the common place where the accidents happen to arteries. I formerly mentioned every mark by which the Wound can be distinguished. Surgeons are sometimes frightened w.th the stroke of the artery being communicated to the Vein, but when we are in doubt to touch the Vein above with the fore finger slightly to hinder any Communicating branch from bleeding, & if the wound be in the Vein we stop it with the Thumb beneath, but if the artery is wounded, the more strongly we press upon the Vein, the more violently will the blood be thrown from the Wound.

The places it may occupy supply are in general 3, it may spread in the common Cellular Subst.ce which happens rarely, where the wound is large the blood rushes thro it, & where it is very small the Cellular Substance & membranes are apt to confine it, or neat a circumscribed Tumour is formed, the blood gets into the Cellular substance but slowly coagulates as

as it is confined by the Aponeurosis of ye Biceps, or a communication may be opened betweing artery & the Vein, now surely it is the same thing whether an artery be wounded accidentally or by design, that is we cure the wounds of Arteries by common Dressings, or if ye wound is large, & the Artery at the same time large, we try to make a strong Compression upon the Orifice, & we have but few Histories of Cures made by means of Instruments, the Physicians of last Century had a Ring, & we have an Improvement on it by Platner.

Now supposing that this method will not answer, we are next to lay the artery in View by an Incision, & then again try the effect of the Instruments, applying to the Artery a Gorget or Sponge, & we have a great number of Cures made in this way, but supposing that we likewise find this method insufficient, there is some other suggested by Mr. Lambert of New Castle, to pass a small pin thro' the Wound, & to twist a thread about it

it, treating it as we do the Hare lipp, but supposing that this is likewise ineffectual, it remains to tie up the artery, to tie a Ligature above the hole, & another beneath, & provided the possibility of saving either of the Extremities in this way tho' the Wound be as high as the upper part of them.

I suppose that the Surgeon is to tie up the artery, & observe the propriety of doing this where there is an Aneurismal Varix, where the Artery communicates w.th a Vein, & we take the following Method.

The Pat.t is laid on a Table or Bed, we apply a Turnequet w.ch is managed by an assistant. The Surgeon for the operation need to have a common Dissecting Scalpel, a Common Probe & a Couple of Needles ready in the most ordinary way, there being nothing unusual in the way of making the Ligature I make a hook of my Probe, the Trunk is wounded. Suppose that I begin with a Longitudinal Incision, which I make gently the

the length of the Incision, so as to see the artery distinctly thro' the Skin & Cellular Substance, so as to bring in view the Aponeurosis of the Biceps, under which the blood[illegible] wounded artery are lodged, for almost always the blood is between the Aponeurosis & the Artery, tho' in one case where I attended the blood was behind the artery. Next I divide the Aponeurosis, avoiding the Vein's which come in the way, take out all Clotted blood, wipe the part clean with a Sponge, & taking in my right hand the hook like a Probe, I fix my Eye on the place, I inspect the wound, & direct the assistant Surgeon to slack the Tarniquet that the blood may run out, & immediately introduce the Probe into the orifice, bending the Patient's Arm, & the assistant straitning the Tourneguet, I readily tie the Artery, or we observe every circumstance mentioned by my Father in the Med. Essays, we pass the 2d Ligature, including no more than one or two of the Vind. Comites, which it is not material to wound

some

be freed of some load, that there is something known which lessens the danger from other Diseases, & therefore pretend to say y^t y^e Bills of Mortality have not diminished since the practice of Innoculation. Now if that can be proved the argument has some weight, but it is no proof, for the practice has been confined to a few cases, & the Bills of Mortality are kept very inaccurately, but the plain answer is that the Small Pox is not naturally a Disease that attends the constitution of a man, does not rise spontaneously in all countries, but arises from causes which we shall never be able to determine, & it is propogated from one spot of the Earth to all others, so our ancestors before the XVI. Century had no Small Pox, it is imported, & we might as well object against the danger of having y^e Plague in a slight manner only, but a very great Improvement has been introduced of late years in the method of mannagement, to take the General Circumstances, 1^st with respect to the

the age of the Patients. I think it is wisdom that we ought to avoid, except in large Cities, doing the Operation while Children are on the Breast, there are many reasons to be given for this, but particularly about the time of y. Dis: breaking out, fits are more common, at the same time they are more dangerous, then the Small Pox may prevent the Child mechanically from Sucking, so we would delay till 2 or 3 years of age, that after the Nursing, the Teething may be over. with regard to the Season of y. year, beyond doubt we ought to avoid the heat of Summer, & still more perhaps the Autumn, but I doubt whether with reason we prefer the Spring Season, & whether or not we ought to Innoculate in the extreme Cold of Winter. I am disposed to that opinion. For Sutton, the extremely illiterate, has done more service to the Mediane by introducing the Cold method of treating this Disorder, than any other person, while I believe his Medicines are not more Victual than these in common use. The

Jaisher

farther advantages from Innoculation, are the introducing this matter not thro' the Lungs, but thro' the Subcutaneous Vessels into the general mass, & there is something besides all this, which we shall perhaps never be able to explain. Before the Operation we ought to keep the Patient on a Cool Regimen, on a milk & Vegetable Diet, & if a Child, he should be habituated to bear Cold, which is as so necessary in the time of the Disease, that we are by no means to expose him to the same degree of Cold before the operation, as when the fever comes on. As to the other preparations before the Innoculation, generally the less of it, the better, we introduce the matter from a Patient presently labouring under the Disease, which is supposed to have some advantages, & in a crude state, which is thought to give the Infection in a milder degree, we may have the Patient in the next room, & puncture a Pustule. But if the Patient can't be got, we allow the

matter

matter to dry on the point of the Lancet, or by we soften it before we introduce it by breathing upon it, or by holding it in the steam of warm water, we introduce it w. a Spear pointed Lancet to give little pain, and we chuse a part of the Skin which is not seen, as there is often a mark left, as when we put in an Issue about the roof of the Deltoid muscle. We enter the Lancet under the Skin, the Child complains of pain under the Scarf Skin, & slightly into the Skin, then passing it slanting, we press the Scarf Skin upon the Lancet with y. point of the fore finger, & we make 2 or 3 such punctures. We discover that the Infection is communicated from a degree of swelling in the Orifice, & redness, and from this to the time of the Eruption, which is in about a week, we purge the Patient several times by a Common Cooling Purgative, & we keep y. Pat. not only on a cool Vegitable accustomed Diet, but we give the drink cold & keep them in a large well aired room with little or no

fire

no fire in it. about the time of the Eruption is the greatest danger in young Subjects, and authors have given no proper Directions about the mannagement than most Physicians Practitioners, when the Child is in danger of growing sick dip the Limbs into warm water, while these imitating Sutton expose the Child to Cold, but without always following the one or other Method we ought to attend to the state of y. Child, & if there is a Feverish heat, the face flushd &c we would have recourse to the Cool regimen by all means we would carry the Child out to the air, giving Oranges &c but if the Child feels Chilly, shivers, and y. Pulse fluctuates & is weak, the common practice is the best, we should dip the Child in warm water, wrap him up in warm Cloaths, give Injections, we also have effect, thus adopting the mannagement to the present appearance.

Lett.

Lecture 112th

It remains that we consider the Amputation, or the manner of taking off chiefly the Extremities of the Body

This operation is frequently performed by Surgeons where it ought to be avoided, particularly in Compound Fractures, where is a breaking of the Bones there is a Laceration of the Softer parts, & a protrusion of them. In such Cases Surgeons find it difficult, or impossible to replace the members in the common manner, & therefore proceed to Amputation, but unless there is complicated with the fracture, a violent Contusion of the neighbouring large Joints, the Limb may be saved by cutting of portions of the Bone, for even in Diseased habits a portion of the Bones can be regenerated, & this happens still more readily when the Constitution is good, & in that last Edition of Gooch's works you'll find no less than 12 Cases

12 Examples where the Bone, especially ye Tibia have been taken off to 5-6-7 Inches in length, & they were supplied in the space of 3 or 4 Months, & we may apply what we find in these cases a little farther, that where a Bone is loosened, & there are no dangerous Symptoms preseng, the Surgeon may take it out, & trust to Nature for the supply. In like manner if a Bone is laid bare, & appears carious, Surgeons run to the amputation, but we would first discharge the matter in the Bone by making free openings in the time which may be done w. common Instruments, we may apply the Trepan here, & in ye Med. Ess. ys you'll find cases described by my Father, where Limbs were saved in that way we may cut out the whole Cylinder of Bone, & tho the Surgeons have not yet contrived very fit Instruments for doing that, it may be possible, we may get at the bone w. a Saw, and by Chissel properly temp. & we may apply the Trepan with a number of

notches

notches made at the lower part, to come in upon the teeth of another wheel which we turn horizontally, whereby we might cut y Tibia for instance thro, & take the middle piece.

Next Surgeons should be sparing of amputation in Scrophulous cases, for generally the Disease breakes out in some other part, nay if nothing is done, greater changes are made in Scrophulous cases by nature than we would often have expected, I have saved the limbs of several by having the amputation delayed, when the Disease was in the Knee, & the swelling was called a white swelling, but the matter broke outwardly without communicating with the cavity of the Joint. But if the Patient has not the Disease in a great degree, & the matter already formed communicates to y Joint & the Patient is sinking under y Disorder, I would give him the chance of Amputation. But a Writer of Experience, Belgar, one of the chief Surgeons in the Army of y Prince

of Prussia in the last War, goes farther, and he has wrote a Book against the utility of amputation in any case, the plain history of it is this. The King of Prussia, for reasons best known to himself, discouraged, and in a great measure forbad Amputation to be performed in his Army, this obliged the Surgeons to have recourse to other methods, & Belgar tells us that after one Battle he had under his Care 6600 wounded men, of this number 1000 were wounded in the Joints, so that Surgeons wd have thought that amputation was necessary, yet by making proper Incisions, giving the Bark largely, which he observed had a specific Virtue, not only in preventing, but in curing mortifications, a circumstance of the highest moment. So Sharp has taken the fancy of disputing the usefulness of the Bark in such cases, of the 1000 treated 600 died, 200 recovered, but without the motion of the Limbs being restored, while

while the remaining 200 had the mate on tollerably well restored, as to be able to do duty in Garisons. now from this Comparison he rejects amputation, & alledges that as many lives would have been lost in the common Method. Now I cannot help calling in question the Conclusion he makes. If you look into the Med. Ys says, you'll find an exact account of the first 100 Patients treated in the Infirmary for amputation of the larger Extremeties, of that Number 8 only died without making allowance for the accident or Disease which gave occasion for y. Oper.n Now we might expect greater Success in a recent Case, when the Patient is in great health, as Soldiers are, than in Distress treated in Hospitals, so if Amputation had been performed, instead of 600 Belgar ought to have lost but 80. But suppose next that notwithstanding the better health of Soldiers in the Army, the Conveniences are not equal, so I shall triple al-

most

almost the Number, & I suppose that 200 would have died in the common practice, we save 800, whereas Belgar saved only 400, but 200 with wooden Legs would be in as good Condition, as where the use of the Limbs was not restored, where the Cure was not compleat, but the Patient must have suffered pain, and dragged their limbs after them as an useless Load, & we have remaining 600 with wooden Legs to ballance the 200 where the motion was tollerably restored, & otherwise the Soldiers in the Extremity the King of Prussia was often in, would have been taken from the Garisons. soit is beyond all doubt, that in the common manner of amputation, where the Joints are much wounded, we save many more Lives than Belgares Method.

I now proceed to the Steps of the Operation itself, but I may add one more Observation Belgar wishing to throw aside the Operation gives me an argument against himself and when it was far from being very tolerably restor

it when a Gang.ne appears, for he observed when the Gangrene was in the Leg only, & yet the Disease would have appeared to have rooted itself higher, for the Inguinal Gland was swelled, he was not aware that the absorption of acrid matter by the Lymphatics had occasioned the swelling, so this argument proves nothing that he should not perform amputation, when the Gangrene is spreading from Internal Causes, must be allowed but if it is spreading from an external Cause, why should we wait the tedious separation, with a great deal more danger than that of a recent Wound, for it either occupies the Surface, & the Sloughs passes upwards, so as to vitiate the Lymphatic Glands, or the matter forms deep, & is increased by a sheath of sound or substance, & in both Cases the Constitution suffers more than from a recent wound, so we should prevent Gangrene happening

happening from external accidents by an early Amputation, but if the Gangrene spreads upwards, the amputation should in general be made in the sound parts.

The Ancients were very sparing of Amputation, because they had not thought of proper Instruments for stopping the blood in time of Operation or afterwards, they had not contrived the Turnequet, which Improvement was only made in the last Century, & they did not know the use of crooked needles for surrounding the arteries, nor did they think of drawing them out, this practice was first thought of by Guido, & afterwards practised by Pare, they employed the actual Cautery, & for Vessels of the smaller kind this might do, but where the larger are divided it has less effect than might be imagined, the contraction of the Artery, the Clotting of the Blood, & the Swelling of the neighbouring parts have been all ascribed to the

hot

hot Iron, neither had it occurred to them to divide the softer parts, so as to prevent the Stump from being Pyramidal, to hinder the projection of the Bone beyond the Skin, they scarcely drew back the flesh sufficiently from the bone, & as to the present method of cutting the softer parts, we are not indebted to Celsus, but to Cheselden.

Let us begin w^t. the Amputation of the larger Extremities, as the Arm, the fore arm, the Thigh, the Legs. It is evident that the Surgeon should save as much as he can of the arm, providing that the wound be not in a place little disposed to heal, but where the Amputation is to be done on the Leg, in consequence of a Disease of the foot, in the common manage ment the Patient bends the knee, so as to rest on the artificial Leg, & how if the Amputation is made immediately above the Disease near the foot, a great part of the member becomes an useless

the Muscles of the Muscles beyond

useless load standing out behind, in common practice therefore we save no more of the limb than is sufficient for a rest, but of late years several Ingenious Surgeons have attempted to save even more of it. Superior extremeties as Mr. Whyte of Manchester, who makes the amputation as low as the hand, cutting it at the wrist, but as Mr. Broomfield finds that when a finger is cut off at the Joint, the cure goes on better, if the Cartilage is cut from the neighbouring bone, we would apply the same thing to the wrist, taking off the very extremity of the Bone, but future Experience alone can determine, whether the amputation at the wrist, or near it, or doing the Operation higher up be preferable. Next attempts have been made to save as much of the lower Extremeties as of the upper, in order to rest upon the Leg. Now as yet such attempts have been made but seldom,

and

and have not always bun successful. a Young gentleman who had bun Apprentice to Mr. Whyte has an operation done in that manner, but when he attended Lectures here he found himself under the Necessity of walking in the common manner by bending the Leg, & had bun told that Mr. Foot had that operation done so at first, but he could not bear the walking upon it, & rather than carry the Leg by bending it, had it cut off in the common way, so in this Method we are in danger of sacrificing too much to appearances, & the old practice seems preferable to this new one. We ought therefore to state the two Methods fairly to our Patient, & leave him to choose, & if he is to gain his bread by Labour I apprehend the old Method will be found preferable to this new one. —

Next let us determine the posture of the Patient, & of the Surgeon in time of the operation, & see the Instruments that are necessary. The superior Extremeties may be

be very well amputated whilst the Patient lies in bed, but generally the Patient is placed on a low Chair. The Surgeon if he is to amputate the Humerus is under the necessity of standing upon the outer side, but if he is to amputate the fore arm he may take his choice, but the outer will answer best, as it is easier to place a Saw for cutting the 2 Bones, wch are in a slanting direction upwards, the difference however is not very great, if we are to amputate the lower Extremities, we place the Patient upon a Table, & for the Thigh the Surgeon necessarily places himself upon the outer side, but if he is to amputate the Leg, he is under the necessity of placing himself between the Legs, to cut both bones at the same time, & to cut off the Fibula before he had done with cutting off the Tibia

The first Instrument to be used is called Tourniquet, for compressing the blood vessels in time of the operation, and it answers somewhat to dull the feeling of the Nerves at the same

same time, the little attention need be paid to this last. the common Tourniquet is made in a very simple way, we take a roller not made very tight, that the shape of it may be altered a little, we sew a piece of cloth or flannel to it, merely to keep it on, & to defend the Patient's skin from the Rope with which we are afterwards to twist it. The cushion is laid upon the course of the artery, the course of the humeral artery is along the inner side of the Biceps, and if we are to amputate higher than the Elbow, we place the cushion of the Tourniquet pretty high to have sufficient room but for the fore arm not to stop the Blood in much of the membrane, we bring the cushion down near to the Joint. In like manner if we are to amputate above the knee, we place it in the hollow between the Sartorius & adductorius femoris, if below the knee, put it between the hamstrings, we twist it with a common Rope, such as Windlaws are hung with, or a piece of very strong tape, and to

prevent

prevent the Patient from being hurt we apply a bit of Pasteboard, or horn, or a bit of white iron lined with leather, we take the Rope long enough to go twice round the member, & to give it room for tying, & in making the knot we are to leave no more room than is sufficient to admit the stick, and we make the most simple kind of knot, and in this way with the slightest touch of the stick we twist very strongly. Now this requires the assistance of another person skilled in the operation, hence Petit has invented a Screw Tourniquet, with two plates, which we can use without the assistance, it is tied upon the member, and by turning the Screw you straiten the rope gradually, thereby making sufficient pressure upon the artery during the Operation. Upon the same principle Platner has contrived a Tourniquet of Wood, & a Leather belt. It is a very convenient Tourniquet, & can be made by a Workman for a trifle. We have another the invention of the late Mr.

Price

Fivie with an Instrument made by a Surgeon in the Army, but I shew you another w^ch is better than any of these, said to be invented by Mr Crane, & takes up the Strap double upon the Axis, & therefore with the same Screw we work twice as quick as with Petits Instrum^t and it grasps the member every where, whereas the other leaves an Opening at the side, & the lateral branches of an Artery may spurt out blood in the time of an operation by a slight touch of the screw we can shew the Bleeding arteries.

Now let us suppose such an Instrument to be put on, & that we are to perform the operation upon the Leg, which is the most troublesome, there being two bones, we make the Incision with a large knife, some have the fancy of making it Concave, meaning to take off the Leg at one Stroke, but this does not do so well as one made quite straight, so we need only attend to its length, whether, when drawn to its full length it cuts deep enough, & a knife 7 or 8 Inches in length

length, will be sufficient for any case that can occur, it turns a little better round when it is crooked some what, & it should be quite blunt on the back, & not sharp like the odd ones for scraping up the Periosteum, which is done with the other side, & the Surgeon not recollecting himself is in danger of cutting himself. Now we are advised to direct the Incision by a bit of Tape or Cloth, but I really believe that this may be thrown aside altogether, as we can judge of the place sufficiently to the Eye, the Tourniquet is managed by an assistant on the outside, & the Leg is held by another placed before.

We next determine where y. amputation ought to be done, & in an adult the Surgeon lays his hand with the upper part along the Joint of the knee, & he will hit the place very well, making a sufficient rest, & leaving Mater. Muscles which are employed naturally to bend the leg, but when the Joint of the knee is fixed they serve to move the whole body

body. It is found by Experience that the Skin draws back more than the Muscles, & evidently the Muscles draws back very considerably, hence Mr. Cheselden has introduced an Improvement, which is to be employd without any exception. an Ingenious Surgeon argues that in the Thigh the rule is not necessary to cut the Skin and draw it back, then cut the Muscles & draw them back, mistaking the length for the breadth, & not considering they are oblique fibres, & the Skin is as apt to retract here, as in any other part. so an Assistant draws up the Skin when the Surgeon put on the Strap. Now most Surgeons observe a rule of allowing a little bit behind more than before, so more skin is wanted to cover these Muscles, he then takes the knife firmly in the hand, & most Surgeons put the knee to the ground, & endeavours to make a compleat Circle, but it is better to make two semi Circles, we begin on the out side, & immediately go from that to the bottom, & we draw the knife so as to divide

the

the Skin, & perhaps to encroach a very little on the Muscle, then turn the knife, & finish it circle with great ease, we have now no more use for the Strap, so we throw it aside, & it should be taken off instantly, & if we find some parts of the Cellular Substance not fully divided, & that hinder the retraction, we divide them, & desire the Assistant to pull the Skin firmly upwards.

We next proceed to finish the next Incision in the same manner, drawing the knife the whole way round till it rubs upon the bone. Now as there are two bones, it remains that we cut between them w. a small double edged knife. Next we do a step farther, push the Muscles back a little, separating them from the Bone that we may cut the Bone as high as possible, we are not desired to cut & scrape away the Periosteum, now really this part may be very much neglected. We are now to saw thro' the Bone, & I show you the Saw for the purpose, I have no doubt but it is one of the best kind, because it resembles

most

most that in common use with Workmen. I have added to that pointed by Sharp a hole for putting thro 2 fingers, but you observe y. the flesh comes in the way, so that we cannot get the saw well applied. Now to remove this inconvenience my Father said that a piece of a linen rag should be slit, & applied to y. flesh to keep it up, but several Ingenious Surgeons, particularly Gooch, has found the Linen inconvt. so have Leather, which answers very well when there is a single Bone, but what is much better I have substituted Metal, & we have the hole either Circular for the Humerus or Thigh bone, or we make it oblong to take in the 2 bones of the fore arm, or Leg, & we have also a piece of Metal for the passing between the bones, & the two plates are made to move upon a hinge. In sawing we begin & end upon the principal bone the Tibia, & we make the stroke short at first till we enter the saw & get a direction from it, when we gradually make them longer & longer. It is y. business of

of the assistant to hold the Leg very streight, but without either bending it backwards or forwards, lest he catch the Teeth of the Saw, or be in danger of snapping thro' the Bones. at the end of the Sawing where the Bone snaps off, there is a little bit rough, now that I believe would do no hurt in the time of the Cure, but lest it should, Surgeons are provided w.th a pair of long forceps, with which they can take off any sharp point. having finished the amputation, we next tie the blood vessels, & the more exactly we surround the Artery the better, we pass the Thread but once, & bringing the knot almost close, we pass in the thread w.th the Thumb, lest it slip over the orifice, and tear the artery, then drawing it we desire the Turnequet to be slackened to see that we have drawn it with force enough to stop the Bleeding, & to secure the first knot. we make a second, & cut the Thread with a common pair of Scissars, so short as to be within the edge of the wound, but so long that we can

after

afterwards easily find them to take them away, which should be done at the first Dressing, but they come to be buried in the flesh, & there is no danger of taking them out then, the Dressing not being performed generally till the end of the 5th or 6th day. Now this is the most common practice, but it is beyond a doubt that we can tie up an Artery in a much simpler manner, by drawing out with a pair of Dissecting Forceps, or with a common hook, such as Cheselden has long ago represented, & by this means we avoid wounding the flesh, & avoid including the accompanying Nerves. But suppose that the Artery can neither be drawn out, nor laid hold of by the Needle, from the particular situation of the Artery, or where the flesh is very rotten, we have recourse to Astringents & Compresses, but we chiefly trust to Compresses, for Astringents approach nearly to the nature of Caustic, & irritate the Nerves, some would rather use a Gara or Sponge as I shall explain afterwards. Now what is proposed

is

is all that is necessary in a Common Amputation. Sharp has proposed that we shd pass a Setan with a thick Cord thro the Skin at some distance from the edge of the Wound, & draw down the Skin mechanically, but if the several measures I have mentioned be attended to, this will not be necessary, & it must occasion a vast deal of pain. Suppose next that matter collected, & carries in consequence of this collected in the head of the Thigh bone, or humerus that the Joint is spoiled, it has been proposed to take off the whole Limb at the Articulation, & in the Superior Extremity, the operation has been done several times. Now in this case we would prosecute Bilgar's Method, & in Mr Whyttt's Book we have a most excellent Example, shewing the possibility of saving the Limb, by not only making an Incision of the softer parts, but cutting out the head of the Bone, & where in Compound Luxation, not only the Limb was saved, but the motion of the

the Joint restored. here too there was a Carries in the Joint of the Humerus, & Mr Whyte made an Incision, pushed it out, and tho' no particular pains was taken to retain y. Member, yet the motion of the Joint was perfectly restored. Cartilages, & even new Ligaments seemed to be formed. I shall show the way of imitating Whytt's Operation, but of doing the Amputation, where that is necessary, in the Superior Extremity, in a way more simple than that proposed by Mr. Sharp. I begin where I am determined to amputate, with being able to secure the Bleeding Vessels, by making an Incision between the Pectoral Muscles, & Latissimus Dorsi in the armpit, & from that downwards in the course of the large Vessels, to lay these in View, & having divided the skin sufficiently, I next take a very large Needle & take up the whole Cord of Vessels & nerves, I do not tie them, but there is a certain way of preventing a great loss of blood, as I can pull it when I please. I next make my

my Circular Incision with my Common Scalpel, with which I beg in the operation, me save the Skin here as in the former operation, which is pulled up by y. Assistant, & we finish the Incision of the Skin before we make any Incision of y. Muscles. Next we cut the muscles on the outer sides, & we would have cut the Skin only on the outer side, if we had meant to save y. limb. Sharp leads his reader into a difficulty from the Idea that we cannot disjoint the Bone outwardly, whereas nothing is easier. We next divide the Capsular Ligament with the Bursa Mucosa over it, & in case of Caries we can now saw the end of the Bone, nay we can even get at the head of the Scapula, with a sharp pointed Instrument, without dividing any material blood vessels. But suppose next that I am to divide the larger Vessels. I have an Assistant ready with a hand Compress above the first Rib, & I am ready to divide the larger Vessels, then having

finished

finished the Amputation, & removed the arm, I take hold of the trunk of the artery, draw it out & tie it, but suppose that I should not be able to catch it, I have my Ligature ready, & I leave it till the first Dressing, that I may stop the Bleeding with absolute Certainty.

As for the operation on the top of the Thigh, even cutting the end of the Bone, it is barely possible, but I would not chuse to engage in it, one gives the matter a free discharge, & we cut out the end of the bone, & cut it off according to the method proposed by Wright.) These are the common methods, but another method has also been practised, that of making flaps, i.e. covering the stump with flesh, thus, if we are to cut the Thigh bone in the middle, it is proposed to take a long knife & shape the flap with, one Eye first on the outer, then on the inner side, then we cut the flesh with any common knife, & having tied up the Vessels we endeavour to make the two flaps tight to one another. Now the objections to this Method is that blood

gets

gets between the flaps, & if a large Vessel breaks out we get at it with difficulty, & from the great surface there is an immense suppuration unless the Cure succeeds to a very great wish, so a late Writer has proposed an Improvement of Halarian, whose Book is worthy our while to look into, he proposes that we should not make such large flaps, but rather make them in the fore or back part, then we are not to join them till the Suppuration has gone on for 10 or 12 days, when we unite them with equal certainty, & w. greater safety but if the Common operation is done properly, the practice of flaps is very unnecessary, especially as the body is not supported on the very end of the Stump, but on the side.

It remains to mention the Amputation of the smaller Extremeties. Surgeons formerly attempted to amputate them with the stroke of a Chissel bruising as well as cutting, with an operation on the fingers as on the larger

larger members, & draw back the Skin after cutting it with a Concave edged knife, & are directed into it with the nail of the finger and thumb, we take off the Cartilage on y. end of the Bone, & we may make two flaps. Suppose the Meta tarsal or Meta Carpal Bones Diseased, & Exostoses from them, Surgeons frequently in this Case take off the whole hand. Now I have seen an excellent Operation by Mr Addi on the foot, there was a very ugly Caries covering the fore part of it, & he slit between the great Toe & the one next to it, & took out 3 Toes with all the Meta tarsal bones, y. Void was filled up, tho not compleatly, he had a Cushion made to fill it up, & he walked without any distinguishable halt, but even this may be unnecessarily severe, if the Meta Carpal bone be diseased, we may cut it out, or we may cut it thro with the Trepan, & take out the part that is Diseased, & the Void may be filled up with an Osseous Substance, or so form so as to answer the purpose of Bone, &

I saw the middle of y. bone defending the other fingers we take the fingers off at Joint & the same knife

we have needles to take them up in case the arteries bleed much.

I have now endeavoured to explain the Operations in Surgery that requires particular caution, and if these are well understood, & the Anatomy of the parts at the same time, you will find no difficulty in adopting 'em to every case that may occur.

Lecture 113th

We now consider the proper Treatment of Patients after the Several Operations, and besides this the remaining business of the Surgeon, Viz. The manmagement or method of Radicating or curing Diseases, as Harnia, Luxations, Fractures, bones in General, Fistula, Distortions of the Limbs by diffrt Machenics, but I shall make a few general Remarks upon the termination of Inflam: mations, & the Cure the Surgeon has in treating it. I have formerly considered the

the cause of Inflammation, I have now only to attend to the evident circumstances.

If Inflammation does not kill a person either from interrupting the functions of an Organ material to life, or by a certain affection of the Nervous System, & is not discussed, it Suppurates, or Mortifies, or there succeeds to the Inflammation a hardness called Scirrhus.

The Surgeon endeavours to discuss by lessening the general Impulse, & this he does most effectually by drawing off from the circulating general mass, for in that the push of the Blood is diminished beyond what we can explain on Mechanical principles, because the Diminution of the mass renders the Irritations upon the heart, & the reaction of the heart & Vessels less, he likewise endeavours to dilute the Blood by giving Diluents, & to evacuate thro' Excretories of the Body; so Purgatives have a remarkable Part, for while they operate like V. S. in a certain degree, they likewise draw off humours from

from the inflamed part, to which they are particularly determined.

We likewise give Acid & acescent Substances which take off the general tension, & lessen the Irritability of the System, to the part itself we apply such Substances as allow it to yield readily to the Stretchings, so watery Substances in general give relief to Inflammations, & by lessening the Stimulus serves to discuss, but besides merely relaxing by watery fluids, or Steams of different kinds, we sometimes venture to apply Substances with an exellent Effect, which seems to be directly opposite to that of Water, as of the Solution of Saccharum Saturni, Acids & even Spirits, we are found to be proper Discutients, because without checking perspiration, they lessen the Sensibility of the Nerves.

Next let us observe what Nature does in Suppuration; that we may be able to counteract that in some cases, or to promote it in others, & to understand this

process

process, you must consider the appearances which take place in the Inflammed part, that the Swelling while it depends upon a greater distension of the Vessels entering into the part there, often takes place, the Error last proposed by Boerhaave, there occurs at the same time an effusion of the fluids, which are generally colourless, but if the Inflamn is violent, the red particles of the Blood may be intermixed. The effused humours change their appearance by Stagnation, they appear very different from the mass circulating, in stead of Coagulable lymph, we find what we call Purulent matter, in which we discover Globules & this may depend upon a degree of alteration which the parts have suffered in passing from the Circulating Vessels to the Cellular Substance, for if a wound is made we don't find the purulent matter till after a certain time, & I believe the Vessels come on in a certain state to perform the office of a Gland that there is a real change made on

on the humours in passing thro' the Vessels, but there is a further change which depends upon Stagnation, absorption, & the Consequence of that the Lymphatic part of our Blood by being out of the Course of the Circulation, & fomented by the heat of the Body, puts on an appearance very like to Pus, besides I do not doubt that the process goes perpetually on, which we may compare to the fermentation of Fluids. I apprehend there is a degree of fermentation in every Tumour, which from being in an inflamed state terminates in Suppuration, the fluids are thus not only altered in their appearances & properties, but the softer Solids are melted down, & when the matter has remained for a considerable length of time, every Patient comes to be destroyed by it, and it seeks its way outwards, where the resistance is the least, now if we admit this notion of Suppuration, we would endeavour to discuss by drawing off from the general mass, but if we mean to Suppurate we must avoid

V.S.

& L. & Burgeng, nay we would keep up a certain force of circulation, which promotes the Effusion.

Next we would apply such Substances to the part itself as would stop the free perspiration, and at the same time irritate the part as oily and Resinous Substances, which also by keeping in the natural warmth promote the process.

Next suppose the Inflammation goes beyond the bounds of Suppuration, and it is disposed to end in Mortification, some have tho't that the more Circumstance of red particles being effused led necessarily into Mortification, now this will more readily have the effect, but it is not a principal Cause, for Inflamm: there is often an Effusion of red parts without a Mortification, nay perhaps there may be an effusion of these from an Ulcer where there is no Inflammation, & the blood is again reassumed, without producing any pain, fulness or dangerous Symptoms. In Mortification there is an Effusion of red & colourless water, but that is not the Cause, but rather the Conse-

quence

consequence of the state of the Vessels, that the
activity of these is in a great measure destroy
ed, & when Blood is effused, & the Vessels preserve
their natural Vigour, there is a constant change of
particles, which prevents the Putrefaction. So
in the Case of Mortification there is an affection
of the Vessels which we cannot fully explain,
they want the power we call life, & in one
Case the seeds of Mortification are laid deepa
than another, so that in some Cases it spreads
almost without the appearance of previous In
flammation. Now suppose y. we suspect from
the Circumstances so well known, that a Mortifi
cation is about to begin, or has begun;
we are not to imitate y. practice of scarifying
y. part, except where y. Mortifica. proceeds from
a Plethoric state of the Body, or there is a very great
rapidity of Circulation, & even there it is better to
draw the blood from the general System, or
from a neighbouring part less sensible, but in gen.l
as we are drawing the blood from the general
System or neighbouring parts, than to irritate the

the part itself, but in general we avoid drawing the blood from vessels which is allowed to be hurtful, I think Scarifying should be avoided in that Situation, & upon the same principle I would likewise reject the practice recommended by Dr Boerhaave, where a part has mortified on y^e Surface, the cutting down thro' the Eschar into the living part till blood is discharged, for letting blood here is found to be hurtful, & by our Incisions we add to the Irritation & Inflammation of the part, & innoculate the part deeper with the matter that is already in a very corrupted state, so the Rule should be, to cut freely into the Eschar, the Effects here are manifestly good, letting out the corrupted substances which from being absorbed, or applied to y^e Nerves might have a dangerous effect, for we find that the Glands swell between the part & the heart, the acrimony of the Liquor not preventing its absorption, then by cutting the Eschar we lessen the Cohesion of its parts, it shrinks on being exposed to the air, and is

more

more readily thrown off, & by using Saline & Aromatic Resinous Substances, we either correct the Acrimony of the matter, or brace y^e Vessels so, that they do not easily receive it. I need say nothing of giving the Cortex freely, w^ch Pelgar after infinite Experience observed to posses a Specific power in preventing & in Curing Mortification. as to the remaining termination of Scirrhus, there is here as much Circulation as prevents Mortification, & continues life, yet the Circulation goes on difficultly, from the quantity of matter infused in y^e Intestines, & w^ch gives the hardness, while perhaps the sound Solids are likewise changed in their Texture Scirrhus succeeding Inflammation, but in many Cases we find y^e Cause of Inflam^n forming slowly, & afterwards producing Inflam^n.

Next suppose y^t there is a Wound, this necessarily produces Suppuration, as its Consequence, we cannot here discuss the Inflam^n y^e Wound occasions without its coming to a Suppur^n because the Wound serves as an Irritation to

the

the Nerves, by the number of Vessels w^ch are divid
ed there is a considerable Effusion of matter
w^ch by y^e Change it undergoes in y^e wounded
Vessels from heat & from absorption, puts on
the purulent appearance, so the Suppuration
follows the wound of Course. The chief busi
ness of the Surgeon therefore is to regulate it
in a proper degree, the Inflam^n may be too
great if the part wounded be sensible, so
in the Hydrocele, or other principal Operations
where Nerves are divided, we lessen y^e Irritation
produced by applying Emollient Substances.

We next proceed with the difficult In-
struments Surgeons employ, & first y^e Surgeon
before he can apply a Bandage, needs a
covering or proper suffering for y^e wound
or Sore he is treating. In some few Cases
where y^e matter produced by an Inflammation
is confined by an Abscess, or Fistula, y^e Surgeon
may be under the necessity of shaping open
the Orifice by a Conical shaped Instrument
called a Tent, which may be made of Lint, Tow,
or

or any soft substance put into a bit of rag, or in some few Cases we employ metal or wood, or it may be necessary that the Substance possesses the power of swelling in order to dilate the opening, as where a Patient has neglected a deep abscess, allowed the orifice to contract, & will not suffer the Surgeon to make a proper Incision, or that he is unsafe, he makes the Dilatation by using a bit of Sponge, to make it possess little bulk, he dips it in any tough substance, as fish glew, or melted plaister, ties a thread about it like it dries, a piece cut off from this dilates powerfully, swelling and afterwards, but we employ at first a very small Tent, for the swelling is so considerable as to excite exquisite pain, so we increase the size of the Tent in the most gradual manner. In some Cases a Substance is used which may be called by the same name, but which is called Dossil, it is made of Tow, a little oblong, & we lay it in with

with a view of preserving open, or dilating any cavity, as ~~the~~ in Dressing the Lachrymal Sac, and we tie a bit of thread to the Dossil that we may easily get it out. Next we use Compresses, or a Substance so thick that when the Bandage is laid on it may press strongly on a particular part, as in the case of an abscess in the Thigh running downwards, & the Surgeon can't get to the bottom of it, he buries it by squeizing the sides together in order to hinder the matter from Collecting, & uses Tow, Lint, or Linen folded, which is soft, & has no Salvage to gall the parts.

After these previous preparations, we lay on our Dressings, & use either the Linnen scraped off, & folded into oblong square pieces. Surgeons now never think of giving a regular figure to their Dressings, forming them into an Oval, as by twisting the ends a little; for it lies unequally on the part, for most purposes the Lint is sufficient, it possesses all the qualities that are necessary for the

(use)

Cure of recent Wounds, it keeps up a sufficient warmth, keeps out the air, sucks in the unnecessary moisture of the Blood, leaving the thicker parts, into which the new vessels shoot.

For the Suppuration of a Wound it is not a matter merely happening from necessity, but Experience shows that the matter is the most powerful healer, for in it a bed is formed for the tender Vessels, so in the deeper Cavities there is first a discharge of the Lymph, then that gradually acquires a greater Consistence, & soon afterwards there is an Elongation of the Vessels within it, so it possesses all the properties to promote healing, & perhaps there are not many Cases where Surgeons do as much as they often imagine. Where a change is necessary in the healing of a Wound, we make it chiefly by internal Medicines, giving the Bark freely, directing to a proper Diet & Regimen, so we apply a Dressing to the Wound in the most simple manner according to the size & shape of the Member.

After

after covering the Wound with Dressings, in some
cases we apply Bandages with the Plaister, as
after the operation for the Hare-lip. Now suppose
that the Dressings are applied, & we are to se-
cure them by Bandages, we form these of va-
rious materials, of Linnen, Flannel, or Cotton, wch
is a medium between the other two in respect
to warmth & Elasticity, & in certain cases we
join Leather & Metals, but commonly we
employ the Linnen, because we procure it
more easily, can shape it more exactly to the
part, & it is less bulky, being the thinner. If
we tear it into one Strap, whether with
one head or two, we call it a single Band-
age, with one or two heads, but if they are
in a different direction, they are called Com-
pound Bandages. To be able to apply the
Bandage better, we roll it into a hard
ball, & if it is not broader than the length
of one's finger, the Surgeon can roll it him-
self, putting the Strap over the fore finger,
but if the Bandage is broad, we take the help
of

of an assistant, whose business it is to stretch & draw away any loose threads as they pass. The methods of applying the Bandage are very few, & there is no necessity for using Technical terms to express them. I can make Circular ascend & descend by edgings, make the Spiral turns, or I can reverse the Bandage if it is applied to a member of a Conical shape, & if it grow loose & twist the Bandage & draw the Strap tight by turning the Roller. Now when I make this turn I use necessarily a great deal of pressure, so I avoid the Ridges of Bones or the Course of the Subcutaneous vessels, on putting on the Bandage, we make it a rule to keep the Ball outermost, whereby it is less in danger of slipping from the hand, & as by making reverse turns, I get the Bandage in a more difficult way, I continue to make a second, tho not otherwise altogether necessary. on taking off the Bandage I alter the situation of the Roller, keeping it now innermost, as in this way

I collect it more readily & conveniently, & the turns I make with a single headed Roller, it is evident that I can make with a double headed one, but as it employs both hands, we avoid it as much as possible, & where y. Bandages are long, the two heads are apt to entangle one another. The only other rule is before you attempt to dress any wound, you ought to have ready every thing that is necessary, that you may apply the Dressing as quickly as possible, for the keeping the wound from the air is very material, & to say it's sharp that Wounds in Battle cure tho exposed to the air, is only saying that healthy Constitutions will get the better of any Difficulty, for where the Constitution is broken or the Wound dangerous, air adds to y. danger. If the Dressings adhere & Plaistery Substances has been applied, we may soften them with oil, or we may cut the Bandage.

We now examine the different kinds of Bandages, beginning w. those of the head.

The

1st The Best Chief. to make it we take a Serv.d cloth about a yard every way, we double it, but not equally, leaving one part a little longer than the other, we then fold it again to get the middle of the Bandage, apply it, some use one hand, but we do it better with both, it is large enough to cover the whole head, in y.e colder Climates it is often used, it is double, & I mean to turn back the innermost part, so I give the outer tails to the Patient, or an assistant, I then pull forwards the Bandage till I find a resistance, then drawing it tight I turn it back & folding it neatly I cross the ends, & in a slight Case lie them, but it is better to cross & pin them. It remains to fix the other two Corners, w.h we do by a knot under the Chin, we thus have a very equal Covering over the whole head, & which we can readily slip off again, & it is used after the Trepan.n but in y.e warmer months of the Year in this Island we may make it of a thin Rag, or we may use a

thin

thin handerchief, folding it Diagonally, and folding it again behind the middle, we then lay it over the head, bringing it down to the Eye brows, & bringing the tails round the hind head, we tie or pin them before, fixing the other end with a pin, & adding Straps to it beneath the chin, we give nearly the same Security as with the former Bandage. Galen long ago has given a Bandage with 6 tails, which many of the Moderns employ, it is laid over the head, and beginning with the backmost tails I make a circle round the head and pin, next I apply the fore part of the Bandage, & to give it a neat appearance I double the cloth just above the Eyes, & bringing it to the nape of the neck, Tie or pin them, to cover the former turns, & to give a sufficient Security I fix the middle two tails under the chin.

A Gentleman who attended Lectures here sent me his Night Cape to supply the place of all these Bandages, & it is by no means a Contemptible one.

But

But some not content with these have proposed making a Bandage with Reverses, as in the Taping for the Hydrocel. in order to give a certain degree of firmness to the Bones of the head. we turn one part of the Bandage backwards & forwards, whilst with the others we make Circulars, so have it in our power to cover the whole head, but I look upon this as of no use, it is troublesome in applying, equally so in taking off, & it is less secure than the former Bandage, & as to Compression, by the former we can make that sufficiently. We might give this further security by drawing a strap over the head, & pinning each turn of it.

Next for particular parts of the head we have first an Uniting Bandage, as for a Cut in the fore head, for drawing y. sides of it together, we take a double headed Roller, make a slit in the Bandage & pass one of the heads thro' it, whereby we can draw it very closely, & we can repeat this turn, mak-

ing

making a 2d slit, now the Contrivance will apply to any other part of the Body, as a Longitudinal Wound in the arm &c. An Ingenious Physician in Dublin has made an Improvment upon this Bandage, instead of one slit in the middle he joins the straps by a number of Threads made to cross each other, whereby the lips are pressed down in a more equal manner, hence I have even attempted the Cure of the Hare lip with this Bandage, tho if I were to go work with pins, I would prefer the Plaister to the Bandage.

Next suppose we are to put a Dressing on any particular spot, as after opening the frontal Vein, I unroll a part of the Bandage as long as to reach to the nape of the neck, & an assistant holds it till the Surgeon makes a circle* round in order to fix it. This called the Division, instead of turning the strap over the head, by turning it Sideways we would have given it a neater appearance, laying it obliquely along the Parietal bone. Suppose I

* Than a pin is put in, but it is better to do it without pins, some use circular Bandages

* Applying my compress to the Vein I run my bandage

* make

* the Nape of the Neck

make my Circulars as before, in order to fix the Bandage, & having done that I reverse the Strap put over the Parietal bone, by which the Crown of the head appears in the shape of a Boat, & we call this Bandage Scapha, it looks neater than the former.

Next suppose a dangerous Wound, that an Artery springs in the head, suppose in y^e^ Temples, that we have let blood in the Temporal artery, & are not provided with a Machine, but oblig-ed to Cure with a Bandage, I begin on y^e^ opposite side, lay on a proper Compress, then twisting my Bandage, drop ing & twisting it at the same time upon the Wound, & by repeating these turns I can make a very strong Com-pression, adding one knot to another till I press in the Compress upon the wound of the artery. but next suppose that the Wound is lower, or that the Surgeon has exterpated the Parotid Gland, we can't here form a Cross, which would come over the Eyes, so we form a knot, twist & make the under Roller new,

the

the uppermost next, & to give the Bandage full
security, I twist & bring it to the nape of the Neck,
so I pass one Roller that was the uppermost
back again, I retain it whilst the other is
brought to the opposite side, & without
twisting on that side, I come to the side
where the Wound is, & repeat these turns at
pleasure. —

The next Bandages proposed are for the
Eye, Let part of the Strap hang down, & I can
go round the head with Edging, covering the Eye
or Eyes at pleasure, making the Edging ascend-
ing, or descending, & we tie them all down with
a few Circulars, such as have been named
Monoculus & Binoculus, but if every purpose of
such is answered by the most common way
of placing the Handkerchief slanting, where an ap-
plication is made to the Nose, some other Con-
trivance may be necessary, for also Fractures,
the Bandage will rather press the Bones, so we
may have a small Bandage round the head,
then having applied a Poultice or Dressings,
and

(

and bring another Strap over the head, cutting holes thro which the Patient can breath, and the Bandage has been named Capistra, resembling the hood put on a Hawk.

Next suppose we want Bandages for the Lower Jaw, one has been proposed called Capistrum of Hatter. we begin with a double, or single headed Roller, which here is preferable, make a number of Edgings upon the Jaw, bring the Bandage forwards, & after having made several turns in that manner covered y^e Jaw with Edgings, I run to the nape of the neck make several turns of that kind, & finish the Bandage by making a few remaining turns over the Chin, by which I give a neatness & firmness to the whole. Now this is proposed in fractures of the Lower Jaw, but for applying Dressings after an operation here, we use what is called the Sling or long tailed Bandage, making a small hole for taking in the Chin, we begin with the undermost Straps, which we cross at the top of y^e head, thus

then we cross the two upper at the nape of the Neck, & then to the top of the head & join them.

Sometimes the Tongue is wounded, & a Method is proposed in the Memoirs of the French Academy, a purse is introduced within the Mouth by means of 2 wires which you secure by a Bandage round the nape of the neck.

Next suppose after the Small Pox, or any burning of the skin of the face, as by Gunpowder, that we need to cover it, we do that by leaving proper holes for y^e breathing &c and beginning with the uppermost or undermost tails, & join it by the middle Strap, we tie or pin.

To the Neck few Bandages can be applied, in some Cases we use a Strap over the head, & a Circular or two as a Retentive, or if the neck is not very long, the Bandage supports itself. Next suppose the skin of the neck, or Sterno mastoid Muscle has been cut, we place the head streight after the operation, & with a double headed Roller we go over y^e head under y^e Arm pits, or we give the same security by pins

joining a Night Cap & Straps to the Cloaths be-
tween the Shoulders.

To the Trunk of the Body a great number of
Bandages have been applied & you will find a
great deal wrote on them in Hasler, but we
may reduce them to great simplicity, obser-
ving that the arms & thedegs are joined to the
Trunk, so nearly in the same manner that
we may take the upper & inferior Extremities
together.

We can make a figure of 8 upon the
Shoulders, & can repeat the turns so often as we
please, or we can make the figure upon the
Breast, or Back only, or we do the same
thing on the Belvis, passing round the body
& the Thighs, or we can make the same figure
with Edging, ascending, or descending upon
the Shoulder, & as the Bandage now resembles
an Ear of Barley, it is called Spica, & what
we do more slowly with a single headed
Roller, we do quickly with a double headed.

Next I can reverse a Bandage very likely

Bandage

Bandage I showed in the head which is called Capellini. I do it likewise on the Trunk viz. a double headed Roller, with one head I make constantly circulars, whilst with the other I make reverses, fixing the first turn with a pin, then I bring the one head over the shoulder, & with the circular I tie down the Bandage, with which I can make 4 Reverses, & I can make these continually in y. same place, or I can make them with 2 edgings, & I can in this way cover the whole shoulder, or any particular part. Next y. very same thing can be done at the bottom of the Trunk. I can make one Roller describe 6 circulars round the Body, whilst y. other Roller passes between the Legs. now in some Cases of Violent Bleeding where Operations are done in the Perineum, Heister has recommended such a Bandage, but the place of it is much better supplied viz. a Turnequet such as I have showed you is the best contrivance with Circulars. Lect.

Lecture 11th

I showed you the way of making Circulars or reverse turns, or of applying a Capillini to the upper or under part of the Trunk, but it is evident that such Bandages ought to be avoided as much as possible, because of the trouble of putting them on, especially using the double headed Roller. Next in the time of putting them on the body of the Patient must be exposed, whereby in treating cases of importance, he may suffer greatly. Lastly they prove galling and uneasy, especially when they pass under the arm in the Axilla, or between the legs, that we need to compress to defend the parts, so we aught only to use them where a particular pressure is required. In different parts cases may occur, as in the fracture of the Collar bone, or in the Luxation of the Humerus, where such an application may be necessary, but for wounds &c we would prefer to them more simple

Bandages

Bandages, & these upon the whole are of 3 kinds.
1st The Sling, it is made with 6 Tails, & I can apply either straight round the Body, or if I am treating a Disorder in the Breast, I begin w. 2 ends under the Breast, & by turning up the others over the Shoulders I confine the Dressings, or what will answer still better, we use the Napkin & Scapulary, the napkin is made long enough to go round the Body, & to prevent slipping we lay straps over the Shoulders, so called Scapullary. The Scapullary is slit & put over the head, or we have a 2 tailed Bandage entire behind, & we may pin or sew it to the Napkin, or we may cross them before, which makes a more equal support. Now I may use a Napkine and Scapullary, at the under part of the belly, but as the Bandage is in danger of slipping upwards, we bring straps round y Thighs, not between them, that the Patient may pass water or go to Stool. If the napkin is too warm, we use a single Roller which may go round once or twice, especially if the Ribs are

grac-

fractured, to put the Patient under some necessity of breathing with the Diaphragm, & we may also use the Flannel on acco. of its great Elasticity.

There is one other Bandage which is very convenient & much in use, the T Bandage, so if you are to treat the Breast, I make ye Tails so as to go round & come forwards again, & having applied the Dressings, we tie the other round round the Shoulders & Neck, & it is an excellent Contentive, & if the Disease is in the axilla there is no better Bandage for keeping on a Poultice we bring up the one part of ye ring the Shoulder, & bringing round under the other axilla we tie it, but the Bandage is almost only applied to the lower parts of the Body, around the Pelvis, & here we can put it on a variety of ways, if we are to treat a Sore or Abscess behind or about the Sorctum, or Os Coccygis. & fix the Circular w. a pin, then applying my Dressings, & bringing forward my Tails I secure them, pinning them to the Circular. Some have proposed in

Cases

Cases of this sort that we might have Circulars tied by a number of pieces knitting to the perpendiculer of the other straps, so that when we have to dress the sore we have only to loosen the knitting, but this addition is scarcely worth the making, instead of a piece of Cloth slitten a certain way, we may have one strap slit the whole way, & with this we can contain Dressings of various kinds, can use it as a Suspensory for the Scrotum, & the common manner is to ~~Tape~~ put it behind, & tie it before, but it is better to reverse this, cutting a hole for the Penis, & bring this firmly & even to the Circular before. I adapt it more accurately, & here in putting on the Circular we should remember to apply it over the Bones of the Pelvis, where the Tailor fixes the head bands of the Breeches. The use of this Bandage is manifold, so we shall put it on really, it may be applied for a Number of Capital Operations, particularly in abscesses about the os sacrum & Coccyges, after the Operation for the Fistula in Ano, in Lithotomy, the Hydrocele, the Operation

operation for Hernia, in treating Buboes, as we fill the Vacuities by soft Compresses where new Dressings is necessary formerly suspending the Scrotum, & applying a Poultice, as in the case of a Swelling of the Testicle, we have a particular Bandage, a Circular is made, on which is made to fit the Patient, & to this we join a sort of Pouch for containing the Scrotum, by means of Buttons & Straps, we can either cross the Straps, or leave them without crossing & we bring the Straps round the Thigh on either side, & this may be worn even on horse back without much inconvenience. to the same Circular we may adapt a large Bagein Cases of Hernia, a bag truss, & for keeping up an artificial warmth it is made of flannel.

One more Machine may be mentioned. Sometimes an Artificial support to the Trunk behind may be of use, as in the Case of Paralytic weakness, where the Medula Spinalis is compressed, & if there is an Ulcer, or Inflamenation of any kind about the Spinal process, or Mus-

cles

Muscles of the Back, when the Patient can't sit
up for an hour and without great uneasiness, he
may obtain considerable relief by wearing a sort
of Stays, only we take care to make a large hole
at the part which is swelled, that we may throw
a support on the neighbouring parts.

Nothing is more easy than to apply Bandages
to the Extremities, the shape of the Extremities favours the turns of Bandages very much, & there are
but few. I need be particular in showing.

Suppose that we are to let blood in the
Arm, after doing that Operation we apply a
Bandage long enough to make 3 or 4 turns of
a figure of 8 at the Elbow. 3 is as much as is
necessary, & the Bandage need not be broad,
if the Vein is in a hollow we put a little Lint
near the Orifice, then a bit of Sticking plaister,
then fill the hollow with a small Compress about
¾ Inch Square, we wipe the Orifice, lay the sides
of the Wound together, & put the Arm into the
position in which it is to remain.

Some chuse to tie as well as to pin, but
pinning

pinning is sufficient, but suppose we proper the dying, we unroll a little of the Bandage & begin to describe the figure of 8 to apply it right, viz we use a knot it ought to be with the view of making Compression, either over y. Compress, or under the Orifice. Now we cannot do it over Compress, so we ought to throw it under Orifice upon the Vein, & we ought to twist the Cord a little to have the effect of pressure.

Now the same turns serves for containing Dressings after the Operation for the Aneurism, only they ought to be applied still slacker.

Next suppose the hand & fingers to be Diseased, the shape gives an opportunity of fixing a Bandage, & giving the appearance of art. after making a Circular or two around the Wrist, we can cross on the back of the Meta Carpus, & go round the fingers, or we pass down by Edgings, repeating the turns at pleasure, but such turns can only be necessary where the Veins are opened on y. back of the hand, for where the fingers are burnt

&c

&c. the thrusting the Bandage thro. betwen y. fingers give pain, so we would slip bits of old rags betwen the fingers, & cover all with a proper poultice, or a piece of old rag. The same kind of Bandages apply to the foot, & the same kind of Observations apply with respect to them.

We now proceed to consider particular Disorders, & we shall begin w. Hernia & Luxations.

1st. Suppose a Hernia or prolapsus of y. Uterus, & that Posture with Medicines have not had a sufficient effect, but a Mechanical Support is necessary, some have proposed to make 2 balls of Earth which are introduced within y. Vagina, with a proper spring, but the pessary is found to be more convenient, particularly that w. moves round in a Socket, or we introduce a ring of Ivory, which answers very well.

Next suppose a Hernia of the other Bowels. I have formerly mentioned y. several methods of reducing them by pressure, posture, agitation of the Body, if these do not succeed, & there are new Symptoms of Strangulated

Strangulated Viscera, & if the Bowels are in the Sack, we employ only the bag truss, but if they are reduced to prevent their falling out again we employ Comp.d Bandages, the common materials have not sufficient firmness. If Hernia is Umbilical, a Circular is put round the Body, the Patient is laid in bed upon his back, with his Shoulders raised a little, so as to relax the parts, the Surgeon reduces the Bowels, & the moment they go back, he lays on the Cushion of the Instrument, then tightens it sufficiently, & the Patient ought to keep in his breath a little to bear it as tight as possible, a Spring is added, that when he inspires it may give way a little, a Scapulary should be added to it, and we might have Straps likewise round the Thighs to keep up the pressure in all States of Respiration we may use a Spiral Spring made so as to be drawn out oval by the Dilatation.

Suppose next the Hernia below, we make Cushions sufficient to fit the Bowels with a

Circular

circular strap, all of Leather with a considerable strength of Spring, the cushion is made of Cork covered with Leather, or it may be made of Ivory, for if it is too soft, a little bit of Bowel gets out between the ring & spring.

Now when we observe that a part has got out between the Ring, we slacken the Bandage, & putting the Patient in the proper posture, we replace it, & again apply the Bandage. If the Hernia is on both sides we must have 2 cushions, in using these Machines, the measure of the Patient ought to be taken in the most accurate manner, poor people may supply the place of this Bandage by covering a bit of wood with Tow, & over all Leather, & securing this with a strap, or with the head band of the Breeches, for Children too these Bandages are too dear & expensive, so cushions may be made of wood & covered with Cotton, and supported by a circular piece round the Pelvis, & a strap put round the top of the Thigh,

&c

we ought likewise to be provided with machines for the Prolapsus Ani, as a Circular round the Body with a spring of Elastic metal covered with a cushion, & made narrow to fit the end of the Rectum exactly.

Now let us consider the Luxations of the different Joints, & here we observe first that from the firmness & inelastic nature of our Ligaments, & likewise from several Dissections of Luxated Bones, it is beyond doubt that the Capsular Ligaments are not lengthened out, but in 19 Cases of 20 at least are torn. Now this being admitted, y. obstacles to the reduction are great the rent of y. Ligaments that the Surgeon may not bring the head of the Bone back to its place in the very same direction in which it came out, that y. head of the Bone may not enter y. Laceration of the Ligaments, but that is not a very principle Cause of the difficulty. For the rent is generally very considerable, & y. remaining part of the Ligaments give the Bone nearly its

its true direction, but still in particular cases this may be a principle obstacle. Next consider the shape of the Bones themselves, that the ends of all Bones are larger than their middle or neck, so that the Ball is catched by the edge of ye Socket. Next, to render our motions more extensive & sudden, the tendons of our Muscles are gen.ly implanted into the heads of Bones, near to their Extremities, where they act with greater advantage, so when a Bone is displaced, ye Muscles or Tendons, considered merely as tendons, are thrown across it, so as to prevent the head from getting back easily. And we must consider next our Muscles as sensible substances, which when irritated, inflame, and thereby grow thicker & shorter, & ye Tendons are actuated by Contractile Substances, wch tho' we direct & regulate in a sound state, yet when irritated they act contrary to our will, by an Instinct of Nature the Muscles is brought into action to free itself when hurt, so when the Surgeon takes hold of the arm, tho'

tho' the Patient wishes to have the Muscles to yield, it is not in his power, but the Muscles begin to resist on pulling. now these are the circumstances that make a recent Luxation difficult to reduce, but if the Bones have remained long out of their place, there are other insuperable resistances added, & first the Ligaments is inflamed by the Luxation, begins to granulate, tho' the Inflammation is not so violent as when the air is let in, & it may go so close round the narrow neck that there will not be room for the Ball to pass thro' the hole that is made, but when the Muscles of the Body tho' not inflamed, & kept long in one posture, the Joint grows stiff, & this stiffness is not chiefly in the Joint, but in the Muscles, so that the Cords of the Hamstrings in such a case are made tense, & the same must happen to a greater degree in a state of Luxation, where the Inflammation & Irritation go along with the posture. Then you will consider that the Muscles are along with the

the Ligaments very often torn, or at least violently stretched, & the Inflammation on that account is still greater. We must likewise take into the account the adhesion of the lacerated & Inflamed muscles to the neighbouring parts, as also the effect of the Bones of themselves, that the edge of the Socket rubs against the neck of the Bone, & the Inflamm: of the Bone & membrane disposes it to produce a new growth. so I've found a process from the end of the Scapula, which had catched a similar process growing out from the head of the humerus, so that the reduction was impossible till these were broke off, & sometimes after the Luxation the Bones themselves alters in size & shape, & growing a great deal larger, & that when there is no fracture of the Bone, or growth of Callus, so the resistances are continually increasing, but it is impossible to fix on a time when the obstacles become altogether insuperable, which must depend on the age, constitution,

cause

cause of accident, or treatment after wd. I've seen where a Luxation was reduced after 3 or 4 Months, but in a great many other Cases after 4 or 6 weeks, the Reduction was found to be impracticable, & there is a considerable swelling of the part. Surgeons have laid down as a Rule to delay till the swelling subsides, & this may be sometimes necessary, but if an opposite rule were to be observed, that notwithstanding the swelling we should make the attempt of Reduction, we would be more successfull, and less uneasiness to the Patient, for the Bone out of its place is adding to all the resistance I've mentioned indeed if the swelling is very large, we may delay a little, but if it is not very excessive, the attempt is to be made as soon as possible but before we begin I think it a good rule to let blood, which lessens the force of the muscles & tends to obviate the Inflammation, from our treatment we would likewise endeavour to relax the Joint by Fomentations, nay

I would propose farther, that the Blood should be let in a large stream, the Patient standing, & from a large orifice, in order to bring on Languor & faintness when the Surgeon would begin to attempt the Reduction, this has indeed the appearance of cruelty, but it saves a vast deal of pain to the Patient, & makes the chance of Success at least much better. Now so far being settled, let us try next the use of Instruments, & I shall take a general Example of the

Luxation of the Humerus, as being a considerable Joint & occurring more frequently, you know the manner of distinguishing. The Surgeon first considers the posture, who is placed on a low Chair, he is next to think of the manner of making his extension & counter Extension or resistance, & we ought to observe one rule here, that we stretch only the Diseased Joint, so we are never to take hold of the hand or fore arm for reducing the Arm, but of the Humerus itself, many muscles

of our Body passes over two Joints, as the Biceps from the Capula to the fore arm, we ought to relax these, so we relax the Scapula by bending backward the fore arm.

Next we lay hold of the members & the common way is to take a Servit or Handkerchief, & to form a knot upon it, putting thro the middle double, by which we can make a loque upon the Humerus, & we give the two ends to the Assistants. Now with respect to the force requisite, if posture is attended to, less force will be requisite than might be imagined, but it is ridiculous to speak of forcing Bones into their place, as with the point of our finger, building on a single resistance, where the Humeri could not be reduced, and where it got into its place in the night time when the Muscles were relaxed probably, & the arm had got a twist, but generally two men of equal strength with the person we are treating, are necessary to extend the Humerus, not that they are necessary when just

put into such a posture, as to draw with the
full strength of their Body, but in the common
way of pulling down, whilst others make the
resistance, a common method is, that one grasps
the Shoulder, & another takes hold of him, where
as 100 drawing in that manner have only the
strength of one person, so we ought to place
one behind another, before & both ought to endeavour
to secure his Body, & along with it the Scapula.
The Surgeon placing himself on the outer side
of the Patt & his business is to lift the arm
after the Bone is reparated to its proper place,
& he may assist a little with a Towel round
his neck & the Patients arm, but he had better
trust to his assistants, so he merely endeav
ours to give the proper direction, some do this
with more force, put a rolling pin covered
with cloth beneath the Humerus but is safer
to use the hand, for not only the skin,
but the Vessels & Nerves are bruised, which
occasion Numbness & pain to the Patient.
Some advise to lay the Patient on y. floor,
the

the assistant takes hold with both hands, lays himself at the side of the Patient, with his feet towards the Axilla, & puling his heel into it, endeavours to separate the Humerus from the Scapula, but suppose that we fail in that manner after repeated attempts, which are better than great force, may by persevering we will often succeed. wearing out the rubeles of the part, & we are more likely to succeed if the Patient from fatigue grows faintish, the yielding of the Muscles have very great effect, but suppose these more common methods likewise fail, we next have recourse to Machinery, & so long ago as the days of Hippocrates an Ambe was used, but it lifts the arm as soon as it begins to extend, so that the Bones are pressed against each other, & are in danger of being hurt, so the late Surgeons have paid more attention to the separating of the Bones, which may be done in various ways, as by a Case of Pullies, which has a prodigious force,

and

and these may be put into a Box as is done by Potit. and after making the extension in this manner the Surgeon endeavours to bring the Bone into its place, but if you let go the machine, the Bones falls back, & whilst it is kept extended, the hand cannot have its full effect, besides the place of it is supplied to us in a more simple & better manner; instead of making the resistance against the Scapula, we make it against the Body, whereby y Muscles that go into the Humerus are not grasped, the Machine is the Invention of the late Mr. Irvine, a box is made to fold in y middle for the convenience of carrying, it is fixed by screws to the floor, it ought to have a broad base, or pieces going down at a distance to make it quite fast. next bending the fore arm we apply the Laque, & we further study the posture of the arm, bringing it a little further forwards. then when the arm hangs by the side in order to slacken the Pectoral Muscles, whilst we extend, we need

to

nied to have a sufficient resistance, & here the machine is faulty. Trivie proposed to make it by a Belt which is drawn over the shoulders, but we would likewise direct that a strong person should with his hands grasp the shoulder, otherwise the force of the Machine is ended, & by the wheel and axis we pull in a more & simple manner than with Petits Instrument, & we can direct the head of the Humerus as we please, & we have all the advantage of the Hippt. Ambi, so this Machine is as good as one can expect for the purpose with little amendment, still however with it you will fail, so that we ought to have some farther methods. I say nothing of the passing a Patients arm over the spoke of a Ladder, while the support is drawn away, which may break the bone, but one Method remains, which I begin to believe superior to all others, & perhaps ought to be used in all cases. I mean the hanging the Patient up by the arms, or

which

which comes to much the same, the raising of arms above the head pushing it strongly upwards. This was first proposed by Mr Whytt of Manchester, tho some Surgeons in this Country had a practice very like it, particularly Mr. Miller at Kirkcaldy, who set his Patient on a Stool, tied his arm to a Beam in the roof, & knocked away the Stool. now Whytts Error lies in the extending the fore arm, the real method ought to be this. the Patients body is to be raised from the ground, & the weight may serve to disengage the Bones, but suppose that not sufficient, the next thing is to raise the Body by the arm, bending the fore arm by a signal to the height of a Stool. suppose then by a second signal to let go the rope with a shock. I tried this in one Case where a famous Bone setter had applied his utmost skill & strength. I had the Patient tied by a rope to the beam of the House, & two feather beds laid below him, he was raised first by the arm upwards & downwards with very

little

Fibula effect, he was then suddenly drawn up a foot or two, & as suddenly let down again, after this had been done 5 or 6 times, if bones were looser, & in 3 or 4 more they became so loose that they readily went in, & I have since succeeded in other 2 Cases where the Bone had been out 3 weeks in the same way, the Patient is not so much hurt as you would expect, he is frightned, but this serves to bring on a degree of Languor & faintness, which is of real use, & the pain he suffers is not so great as in the former Methods.

Next suppose a Luxation of the Fore arm. I showed you the place generally where the Luxation Bones are situated.

We try to disengage them by drawing them as under, & we have such firm hold, that if the shape be observed, we seldom fail. If the fore arm be so much distorted that the large process, the Ulna has turned to the fore side, from the Laceration of the Ligaments, no doubt the treatment will be more difficult in

in like manner if the Luxation be in y^e wrist or fingers, it is easily known, & for y^e most part easily reduced, tho sometimes difficulties occur which we can't altogether account for, so Mr. Addie never was more at a loss than in reducing 2 fingers, which cost him for 2 hours work. In like manner I've seen a great deal of work in reducing the great Toe, in one case the Bone had been out 10 days, and it required the greatest strength of 2 persons pulling to reduce it, but attending to posture, & slackening the Muscles, the difficulty is generally not so great, we may meet with Sprain's like Luxations, but there is only a Swelling in one side, without a corresponding hollow, tho the Swelling might be so hard that we may suppose it Bone.

The Luxation of the Ancle is easily known by the length of the foot before, & the shape of y^e part affords a convenient way of making the traction. the Knee is sometimes a subject of Luxation, which is curable, see anc

Case

case of Heister &c and I have met with two trials, so we are not to despair as Surgeons have done, for considering that there the ligament must be torn, & suppose that it is so sensible that it must be fatal, so that they advise to have recourse to amputation, but if there is not great Contusion we would endeavour to make a cure. The last point is that of the Thigh, & formerly shewed you not only the method of distinguishing, but of treating it. Suppose the Luxation inwards we first bend the Thigh nearly to a right angle with the body & slacken the Psoas, & Iliacus Internus Muscles by turning the foot inwards, we give the knee to 2 assistants who pull it strongly, while 2 more hold the Pelvis firm, the Surgeon placed on the out side grasps the top of the Thigh with one hand, & the bottom with the other, & pressing in the knee, the Bone may slide with great readiness into its place, but when the Luxation is backwards it is more difficult

difficult, & we follow the method recommended by Mr. Potit. we take Potits Instruments w.ch. are horns, lay the laque into the groin, fixing the other laque above the knee, & after the extension is made, the Surgeon draws out the knee & pushes in the head of the bone.

Now with regard to our Bandaging the Joints after reducing Luxations, the old method was to tie them up as after a Fracture; but of late, from a single case, where after reducing the Joint of the Thigh, the Patient was able to walk without a Bandage, Surgeons speak of using none, but the Joints need Bandages more or less according to the kinds of motions they perform. the Ball & Socket will need Bandages least of all, & the hinge next. The Thigh therefore will stand least in want of it, we prevent the Motion which produce the Luxation, if it is inwards a little more is necessary than to tie the two knees together with a Garter, but let no Surgeon think of applying that only, for the Patient will use

use more freedom than the Surgeon allows, & he will lay the blame upon the Surgeon, so he ought for form's sake apply a Bandage, wch can do no hurt. In like manner when the Humerus is reduced, he puts on the waistcoat, & wraping a bit of Roller round the arm, pins it to the waistcoat to keep it inwards, or he pins a scarf to it, but I would propose to add Compresses with 2 or 3 turns of Spica Bandage. If the fore arm or knee is Luxated, a careful Bandaging & attending to the posture is necessary, relaxing the parts as much as possible, but when the parts have recovered their Tone, the Bandage may be slackened to allow of some motion, to prevent the stiffness or Concretion of parts.

Lecture 115th

The nature & Treatment of Fractures so much resembles that of Luxations, that we are led next to consider this Subject

we

we readily discover a Fracture from consider-
ing the previous accidents, the pain the Patient
has suffered and continues to suffer in the
part, the Swelling of it, the shortening or
distortion of the Member, & when the Surgeon
takes hold of the two ends of the Bone, he is
sensible that a particular place yields like a
Joint, and whilst it yields he feels & seems to
hear the crackling or grating of the Bones,
or as Surgions speak, their Crepitation, so
that if proper attention is given, you will
seldom fall into a mistake. As to the time
of reducing the Bones & attempting a Cure,
what I have said with respect to the
Luxations nearly applies, for I would
be much disposed to reduce a Fracture as
soon as possible, instead of always wait-
ing till the Swelling has much, or entirely
subsided. We draw blood freely if that has
hitherto been neglected, we foment the
part, apply an Emollient poultice for
a few hours, or the space of a day, but
not

not wait till an Inflammation in y. case of a Fracture shall afterwards subside in a great degree, for the sharp extremeties of the Bones hurling the Muscles maintain the Swelling, or may even increase it to a greater degree, & by delay the Surgeon loses instead of gaining ground, his own Judgment therefore must very much determine him, but the last general Rule is to attempt the Reduction as soon as possible, the manner of bringing the fractured Bones together to their proper place is nearly the same as in Luxations, but it is plain that there is a greater difficulty of keeping them in, a Luxated Bone when reduced gets into its proper place Socket, whereas in the fracture the smallest alteration of the situation of the member makes it slip off again.—

Or in treating Fractures the Surgeon first makes an Extension, & a Counter Extension, then replaces the Bones with his hands

hands, then he applies Machines w^ch keeps them in their situation. Now for attaining the first purpose of bringing the Bones to their proper place, there is the same necessity of relaxing the Muscles before an attempt to reduce a Fracture, that there is before reducing a Luxation. I mentioned this long ago in the general way, but in one particular the observation has been published by Pott, with regard to the situation of the Leg. I used to observe that we might relax the Leg instead of stretching it to the straight Line with the Thigh, but he further directs to lay the Leg in the time of the Cure upon its outer side, or to be more particular if we are to treat the Fracture of the Humerus or in general of the Arm, Surgeons tho they have paid little attention to the Muscles, yet have (generally speaking) given as much relaxation as is necessary. In a fracture of the Humerus the Patient is seldom confined to his Bed, hence a Surgeon in

Dresses

Dr. Sprengt treats the arm hanging easily by the side, & the Patient binds the fore arm hanging in that posture, the advantage of this is, that he relaxes the Biceps Muscles.—

In like manner when we are to treat the Fore arm, whether the Patient is confined to his Bed or walks about, Surgeons put the arm in the very best posture, bent towards the Humerus & hung in a Scarf by the side, when all the Muscles that can make material alterations in y. broken parts are relaxed to the utmost, y. Pat. keeping the arm in the easy posture between pronation & supination. The principal Improvements rel. the lower Extremities, now with regard to the Thigh we ought not to stretch it in a strait line with the trunk of the Body, when the Muscles tend to pull the parts asunder, so we ought to bend the Thigh to an angle, & farther the Thigh ought to be laid on the outer side, which Pott directs, & the reason

reason, that as the Joint of the Knee performs Flexion & Extension, the thick muscles are on the fore back part and back parts, so bynesting on the outside the bone is nearer to the Surface, and the broken peices better supported in its whole length. Now next as regard to the leg we ought to bend that upon the thigh, for when the Patient stretches his leg the whole leg is drawn back, now bending it under the knee we might keep it bent resting on the back part the muscles are relaxed in that manner, but then the Knee projects in one part of the Bed the foot in another, & there is a difficulty of preventing the sloaths from pressing on these, tho' as to the relaxation of the muscles it is the same whether the body is laid on the side, or back, but I prefer Cattle Betts of the side, because the surface is broader, & no part stands up to give inconvenience or to require contrivance which are embarrassing, but it is material to have a clear view,

That

that the Muscles are equally relaxed in both ways. for can we imagine that if changing the back from the side was making a total change of the Muscles, but the Patient may have the relief of a change of posture, & it is easier with regard to the Trunk that the Patient lies upon his back, but tho' the Leg be upon the side it is not necessary y. the Trunk be upon the side, for the Patient may rest very much upon his back, while the Leg rests upon the side. Now after setting & keeping the Limb in this posture, for the posture which is best for the Reduction is best afterwards when the Bandage is applied. it is very possible to turn y. Patt. over with almost no alteration upon the fractured Member, only we put a Pillow under the Thigh, or we may have contrivances, such I may shew very soon, at the same time attention should be paid to the raising the whole body, the only Contrivance for this purpose is a Rope hung in the bed, which

which requires a very great Effort of ye Muscles.
I saw a very excellent Contrivance by an Ingeni-
ous Tradesman, a Bed with a Hinge in its
middle, & by turning a handle the body was
raised in the most equable manner. Now so
far we observe of the general posture in wch ye
Body may be put. Next having ye Dressings
ready we begin to reduce ye parts, we press
down the Muscles from the upper part of the
fractured Bones, in order to relax them, and an
Assistant holds the upper parts steadily, mak-
ing the Resistance, another takes hold of the
under part, & makes the proper Extension
with his hands, for if posture is attended to,
few Cases will occur where the Machines of
ancient Writers are at all necessary. The Surgeon
then manages the broken pieces so puts
together the Extremeties of the Bones, & you
will observe here that tho' the Bone be broke
in two places, & the middle piece be loose,
we are not without urgent Causes, as an
evident appearance of the fragments are
much

stuck in the larger Vessels, & bringing on Convulsions, to remove it. for the laying y^e^ deep parts open to y^e^ air increases y^e^ danger greatly, so if one person has his Leg broke by a blow w^th^ a blunt Instr^t^ & y^e^ skin sound, he will recover better than one y^t^ has y^e^ bone cut w^th^ a sharp Instr^t^, if a Tooth can be transplanted from one person's Jaw into another, or the Testicle of an Animal, a Bone will live more readily as it remains connected to its Periosteum, & still has y^e^ Circul^n^ going thro' it, tho' less freely than before, & is capable of producing callous matter.

Now supposing the Bone properly adapted we must consider y^e^ means used for retaining, & we first employ it a View of supplying y^e^ firmness, or keeping y^e^ Limb streight, & preventing Retraction, & some substances firmer than common Bandage is necessary, some have used Metals, others Leather, but y^e^ Substance w^ch^ is most common, & y^e^ best, is thick Pasteboard, it is made wet w^th^ water, & a sponge

so

so as to take in the shape of the member, & so on drying it gets suffict firmness. the thick pasteboard has a greater advantage, by y. Veins running in y. Interstices of such common compresses, & wt Surgeons call Splints are freed from too much compression, & y circulation goes on better. the Splints were made formerly very short, but a long Splint extending y. whole length of the member is evidently preferable, for the broken part comes to ~~rest~~ the center of motion motion, & the more distant they extend from the fracture to confine y. motion, ye less y. bones are affected, but there is no necessity y. they should extend beyond the bones affected, because from y. posture recommended, the nearest bones are not brot into y. same line, or in y. fracture of y thigh for instance, they only extend a little to press against the sides of the leg bone, we line these substances wt some soft material, as a Compress of Linen or flanel to prevent the skin being galled. Next the Splints ought to

to be of consid.ble breadth, & in applying them we avoid y.e Subcutaneous Veins, & still more y.e Ridges of Bones, especially if y.e Member is to rest upon y.e ridge of bone. For comm.on practice in y.e upper Extremity, or in y.e Leg two Splints are suffic.t, & in y.e Thigh 3 are all y.t can be necessary, & 2 will do if we make them of a proper breadth.

Next w.t respects to y.e Bandage, 2 kinds are in use, y.e Roller & y.e Compound Bandage. For the applic.n of y.e Roller, it is already understood. y.e Comp.d Bandage has generally been made w.t 18 tails, or we lay 3 pieces of Cloth together, making y.e breadth of a Bandage, equal in length to y.e Member, suppose I am to apply it to y.e Leg, it is laid in before hand, & y.e length of it is such as to go round the Member once, & more than a half, y.e inner tails are somewhat shorter than the outer we apply the several Layers one after another by beginning w.t y.e place fractured, then we apply the others either quite streight, or we can

can bring them slanting, on ye middle tails we then fix them to a pin. Another kind of Compd Bandage has been described lately as a new Invention, tho' it is pointed out by Scultetus 120 years ago, it consists of a No of Straps & Edgings, ye edge of one being over ye edge of ye next, & they are all kept together by a piece of Linen sewed across the outer, or back part. Now if I am to use it for a conical member, I make ye upper straps longer than the under, we lay it in as before under ye broken bone, & we observe ye same gnd rule as regd its length. In applying it in order to get the turns to cover each other exactly, we begin at ye under most part, & there is no occasion for ye pin till we get to ye upper part, ye Bandage has a very neat appearance, it forms a Spica by the crossings described on ye fore part, yet upon ye whole I apprehend to our common Bandages, is to ye full as good, if not better.

We might make a great No of Tails in each piece of Cloth, for as ye former I can beg in ind ye or

on y. fractured place, & if any part goes wrong I can alter it readily but here, if there is the smallest variation I must apply it anew, but either will answer tolerably well.

All Authors without exception apply y. Bandages improperly. The method of Heister, in wch he is very commonly followed, is plainly this, suppose the cure is to be made by Rollers & Compresses & Splints, there is first a bolstering Compress constantly used, some bit of soft cloth, in order to retain y. fractured bone, as the Humerus, suppose y. ends of it are pushed loosely over each other. Heister recommends to use 2 Rollers, a short & a long one, the short they put over the common Compress, beginning at the fractured place, & going down by Edgings they cover the whole, or a great part of the Member. Now after that is put on loosely y. Splints are applied, & over these y. 2 Rollers is applied very tight, to confine the Member. Now what is the use of y. first loose Compress. It is evidently an incumbrance

Incumbrance, & y. same thing is to be said of the first Bandage, & if it is to be put on loose, it serves no purpose, if it is made tight it occasions considerable swelling, it is meant as a defence, this is easier given by lining the Splint it. Linen.

Now suppose y. used the Comp.e Bandage, as y. 18 tailed Bandage, it is to be imployed as before, a Compress is religiously laid on them, the inner layer is applied, then we put on y. Splints, & over the Splints we apply y. 2 outer layers. Now here as before the Compress & their own layer are mere incumbrance, & y. leads me to lay aside on their own principle 6 of the 18 tails, 12 tails are quite suffict, & to give these more firmness some have spoke of taking Flannel, but Cotton will answer better, & we may make more tails in each layer that they may apply exactly, or why does a Surgeon put a Bandage next to y. Part & the Splints above it, would it not be better to put the Splints next, & to secure them w.th the Bandage, this is the very use of y. Bandage, & if the Surgeon shows y. he cures by applying

a 12 or 18 laild Bandage in ye manner of tying the Splints &c. knittings are alone suffict for ye Cure, but I am disposed to keep ye Bandages along w.th ye Splints, the Cures may be made without it, or to take 2 gen.l Examples of ye method of treating ye Humerus, suppose I have ye Splints w.th I fit to ye sound arm, I lay 2 of them to the arm & take the Patients measure, now the Pat.t being put in a proper posture, sitting in a Chair, & leaning to ye side affected, ye Surgeon holds ye made part, & ye assistants ye ends. another Surgeon takes ye Pasteboard & applies it accurately to ye member, avoiding ye Course of the principle subcutaneous Vessels, w.ch run upon ye inner side, now you will find by ye best place is upon ye fore & back parts, where ye muscles are ye thinnest, & here 2 Splts are suffict Next I would secure these to a Roller, w.ch in ye Humerus is preferable, in order to secure ye Paste board, for in fait of Roller is a former & better applied than ye Compound Bandage, where therefore, as in the Humerus, the Bandage can be

be put on & taken off without y. Pat. shifting his place. I prefer y. Roller. beginning w. circulars on the fractured place, I go upwards to restrain y. Muscles wch are most likely to disturb it. & I cover the whole by Edgings, then return by descending Edgings, in like manner secure y. lower parts, & coming back again I particularly make Circulars near y. broken part. Now after y. I support y. arm in a Scarf, to prevent it from swinging & I make a good one wth a common Serviet. I bring the ends over y. opposite shoulder, & tie or pin them, than I gather up y. Scarf, bringing the fore arm to y. proper flexion, & I fix it in that situation to the part y. goes over the shoulder by a pin, still a part behind hangs loose, but to prevent the swinging of the arm I take that in & fix it w. another pin.

Now you will observe that we are never to make the Suspensory so strait as to draw up the fore arm, but merely to support & prevent the swinging motion, whereas by making it tight we might force y. ends,

of ye Bones to part from each other.

Suppose next ye ye fore arm is fractured, it may be very well treated in ye same manner, or we may here employ ye 12 tailed Bandage, or with out Bandages at all it is possible to make a cure by tying the 2 Splints together, tho' we should always prevent ye parts by slipping by ye turns of a Bandage, nay we may add over all, (if the Patient is not Cautious a case to take in the whole fore arm, reaching to the fingers, & including the whole hand to prevent the rotation, for as the hand rolls by means of the Radius, if the Radius is broke, the motion may prevent the union, we then hang the arm in a scarf as before, or we can make one more simple viz. a common handkerchief, I support the arm in the middle, throwing the corner backwards & tying it round the neck, or pinning it to the cloaths, & twisting ye end w^ch is thrown backwards round ye Elbow, Spin it as before.

Next, suppose ye ye Thigh is to be treated,

broad

broad Splints are recommended by Ball, which answers very well, they are to be applied to the outer & inner side of the Thigh, & are lie over them the Compound Bandage, we in like manner apply Splints to the Leg of Pasteboard, & with Holes sides made for the Ancles, some recommend Leather, but y. Pasteboard answers as well, & we can have it always ready, for we need constantly to take that measure.

Now if we study y. posture, it is wd. in common practice, there is no occasion for any other Machines, but it is right to know what has been proposed especially that we can adopt them to particular cases. —

I have said nothing hitherto of what are called Splints, firm substances covered w. Straw, & we are put on y. whole length of y. Member, for from y. Situation recommended, such substs cannot be applied, & they are very troublesome, but as I have observed y. by y. bending of y. Joint of y. knee, while y. Pat. is laid on his back the Muscles can be relaxed very considerably, it

it is worth while for Surgeons to make Improve-
ments on a Machine of Petit's, wch answers very
well where ye Leg is extended, & may be made to
answer in ye position I have recommended,
he trusts to a Box for making ye Extension,
wch is very simple in its structure, a pulley is
put into it, the several Dressings is laid upon
the Box, as the Compt Bandage &c, & after ye
Leg is dressed, we lift up ye side pieces to sup-
port the Leg, & if any part is not sufficiently
supported we put in a little Tow, then we
raise the Sole piece to prevent the Cloaths
from bearing on ye point of ye Toes, & we can
raise ye Box as we can do a Writing Desk,
altering ye angle, & we might use it when the
limb is laid in its best posture, by making a
Joint at the Knee

If we want to transport a Patt wth a broken Leg,
Gooch has prepared a Case of Wood, by applying of
wch he may be transported with great safety

Next suppose a very oblique fracture, accom-
panied, cover'd wth ye Muscles of the Thigh, or
Leg

suppose a compound fracture where there is a wound of the Tegumnts, w. a breaking of y. Bones. this may be much better reduced having reg. to position, than in following the old method, but if we are not able to succeed we would imitate Gooch, instead of amputating, we cut off y. extremities of y. Bones, then reduce them, & if void will be filled up, but to assist in this machinery it is thought to be necessary for Extending y. Limbs, I shew you an Instr. w. Mr. Gooch has invented for this purpose. In a case of that kind where the high bone was broke, w. a bullet entering on y. outside & making a large wound my Father contrived a Box w. a cushion which is made to rest against the Pelvis, y. Bone had lost about 3 Inches of its length, & the muscles drew it together. Straps are laid round the knee, & ancle, & brought to the end of y. Box to keep up an Extension, varying the plaid for some days, & apart of the bottom of y. Machine drew out to allow the wound to be dressed, but it becomes intollerable on

and

account of the pressure, & y. attempt was at last
quite up. Gooch makes the resistance on y. thigh
a circular pad above y. fractured place, while
the resistance is made by another circular above
the knee, & a 3d. under it, we join the two circular
by means of Cylinders of metal, & making the
extension by turning screws, so when galled
by one strap, we fix the other, & a Joint is added
wch. we fix to a Bolt, or I have construded a ma-
chine upon the same principles, of wood, wch.
Cylinders, wch. rise more from the thight, &
room given for applying Dressings, it has
Leather Straps &c or I shall show you a contrivance
of Mr. Aitkin's in Town, where we make the
resistance not upon the Thigh but upon the
Pelvis, & we support the machine by proper straps
passed between the Legs, & this machine will be
of equal use where the fracture is very near
to the top of the Thigh, but we ought to bring
the Limb into the most relaxed posture by
bending it. for this is intended, for y. Limb
lying in the same posture in the same time
with

w^t. y^e. body, but if one of y^e. pieces of Iron were made to bend, the Thigh might be push'd down wards into the bended posture of the foot, besides having recourse to such machines in Comp^d. Fractures, where y^e. Suppuration is large, we add to the Dressings pieces of oiled or waxed Cloth over y^e. Bandage to prevent y^e. matter from spreading, y^t. we may not be under the necessity of taking away y^e. apparatus abtogether. Wat the same time g^ve the Bark, observe a proper Regimen^t. One of y^e. long Bones the Clavicle, remains particularly to be mentioned w^ch. is sometimes luxated, and sometimes broken. Now in both Cases it will occur to you that the principal Intent here is the drawing back, for the very use of y^e. Bone is to support the Shoulder at a proper distance from the Trunk, so we draw this back, & a very slight Bandage is sufficient; they generally use y^e. figure of 8, but it has not y^e. fullest effect, or it galls y^e. armpit, so by a well contrived Waistcoat w^ch. is drawn to. Buckles behind more

A of the Shoulders

more can be done, & we can add other straps to supply the place of the Spica Bandage, & the reverse we cannot apply here accurately, nor without a good deal of trouble to y. Patient, & we still want some simple machine to answer the purpose here; so where y. Clavicle is broke, a very considerable Deformity is frequently left. I may add one Contrivance further, where we want to defend a member against prepare, we may have pieces of wood, w. Slip into each other w. bits of Lane wapping across, w. can be slipped out, & carried from place to place

Lecture 11.

We have now considered Fractures in a gen. way, but some of a particular Cases remain to be stated. it has sometimes happened, as where the Humerus was fractured about y. middle & y. treatment not very careful, y. a Joint or motion remained at y. fractured place,

now

now for the proper treatment of such a case we are indebted to the Ingenuity of Mr Whyte of Manchester, who proposes to make an Incision at the Joint & to saw off the ends of the Bones, we thus reduce the case to a compound Fracture with protruded Bones where the Extremities need to be amputated, then perhaps the exposure to the air alone might have been sufficient, where if bone is single we readily cut it, but when where there are two bones we may cut off portions with the Trepan &c In like manner in the Luxation of a Bone, where the end protrudes, instead of having recourse to amputation, if there is not much Contusion we would cut off the piece, and reduce the bones & the motion of the Joint may be still preserved, see a case of this kind in Broomfield's Book, nay in some cases where, notwithstanding proper attention to posture from the Swelling &c comes on before the Surgeon was called, it was found impossible to replace the Bone, a part of it being cut off, & the member being brought

straight

straight, beyond the expectation of the Surgeon a new end formed to the Bone viz. Cartilages, & all necessary apparatus for motion, see a Case of this kind in Wyeth.

Next there are particular Bones, & particular parts of the Bones we may be fractured, & when attention is to be paid of a very different kind from what I have yet mentioned, owing to their situation, suppose any of the processes which cover & protect our Joints, & serve to direct their motions be broke, as the Olecranon, the Acromion, the Patella, the processes of the Leg bones, we are to order a very different posture from what is generally recommended in fractures. There is in the fracture of the fore arm, we recommend the bended posture, if is broke, we must extend the arm in order to relax the Triceps Muscle, wch is inserted into it, in like manner if the Acromion be beat downwards, or fractured by the Os humeri being pushed up against it, we relax the parts by bringing the arm a little

but if the Olecranon

a little forwards, & pushing it upwards, & it will be right in the time of the Cure to allow a certain degree of motion, whereas in other Cases of fracture the best Method is never to shift y. Bandages till the end of the Cure, unless the part has been swelled, & y. Bandage grown slack, when we ought to tighten it. & our first attempts of motion ought to be 10 days after the accident, the Ichorous matter scarcely forming before y. time.

One particular Bone the Patella, requires to be treated in a particular way, whether it is luxated or fractured I mentioned the manner of reducing it when luxated, formerly, but supposing y. we have made the Reduction, how are we to keep it in its place? for it is very apt to fall out. One Gentleman who attended us here met w. this accident, & it had slipped out 10 times. I directed him to apply a Cushion to the outer side of it &c but I have lately thought of a contrivance w. will answer tollerably well: it is made by Wilson y. Leg maker.

Next, suppose the Patella fractured, w. happ.

happens gen.ly not from striking it against a sharp substance, but from a sudden effort of the muscles, especially when the bone is drawn upon the edge of its pully, over the Cavity of the Joint where it is not fully supported. you will find that Hiester & the other old Surgeons proceed here w.th the same Caution as in y.e leg was broke. The member was extended, & y.e broken pieces kept together by a Bandage, & the Patt. confined till the Union was completed, w.ch might here quire 6 weeks or 2 Months, when it often happened y.t y.e motion of the Joint was lost, partly from the Joint & muscles becoming stiff, & partly from y.e growth of Callous, but of late years Mr Warner & some others advise to allow y.e Patt. to move y.e Joint freely, nay y.t we ought to make y.e flexion & Extension of the knee. Now I cannot help thinking these Gentlemen run into an opposite extreme, for from the great size of y.e Joint, & y.e great motion of the Patella, y.e ends may be drawn so far asunder, y.t the granul

granulating matter is not able to connect them, so y. y. force of y. Extensor Muscles of the Leg will be intirely lost, & in this Case an irregular Cadous will grow out, nature taking Care to fill up the void. I would strike a Medium betwen the two Extremes. It is altogether nessary y. y. Leg be fully extended in order to relax the Extensor Muscles fully, & we next have in view to keep the Leg in that Posture during the Cure, & for this purpose we may use the Contrivance of Splints tied to y. Leg & Thigh w. Straps, or we may apply pieces of white Iron in the same manner, & instead of Bandages made in the common way, I would recommend a Couple of Straps shaped to the Patella, an apis Card prepsis down y. Muscles, & y. upper Compresis laid on, we next join the other, then buckle the Straps. I draw towards each other the two Circulars, & to prevent motion I apply either pieces of Tin or Splints or a piece of Pasteboard, or I might lay the Patients Leg in Petits fracture Box, giving a

+ upon the member and by four cross straps

a relief to the Patt by raising y^e leg higher or lower, in about 10 days or a fortnight we slacken the straps, & examine the state of the part, & we begin perhaps to allow as small degree of motion, & endeavouring as far as y^e nature of y^e thing allows, to shape the Cadous to the Joint, so we give all y^e relief y^t art allows of without y^e risque of y^e Patt losing y^e strength of y^e Muscles, if the fracture be Longitudinal the treatment is still more simple, we prep together y^e pieces by Compresses put in at the side, & we sooner, &c^a safely allow of the flexion & extension of the Joints, if we are not provided w^t such straps as I have mentioned, we may employ the Rollers y^t have been recommended w^t proper Compresses. We are next led to the treatment of

Lacerated Tendons, the Tendons of the Heal you know has been often Lacerated, & not unfrequently either the Tendon or Ligament connected to the Patella, particularly the Tendon connecting it to the Tibia, the whole

whole force of the Muscles being concentrated upon it, while there seems to be fewer fibres in it than in the Tendon above, or perhaps it is more readily observed, the softness of the flesh hindering us to feel the other so exactly, but y^t it may be discerned above the Patella I know from one case of an Elderly Gentleman, who coming down one of our Staple Lanes, slipt his foot, & indeavouring to recover himself, made a great effort, did not fall to the ground, he felt immediately a great Sameness & pain about his Knee, & felt above it a deep hollow, into which I could lay y^e whole breadth of the Thumb & above that y^e hard edge of y^e Tendon w^ch was torn away, & had carried some of the hard Cartilaginous covering of the Patella along with it.

The Method of Cure I proposed was this, y^e Pat. was laid in Bed, the Leg fully extended. I got the Circular Setts applied above & below y^e Knee, first pressing the Muscles down from y^e top of the Thigh the whole way, & not contented with holding them in y^e posture, we began a very thick Roller at the upper part of the Thigh, and

continued

continued to the whole way down by Bandages, w^ch pushed y^e Muscles down before it, & to prevent it from slipping, we put a Circular round the Calves, w^ch Straps, we were contented w^th a common Leg Bandage, but perhaps a Plaister Bandage would be better, first shaveing off y^e hair, & after that the Circular was put on, and the Calotta pushed as high as the Legament would admit, & having drawn the Circulars together, we applied a Paste of Castor board of considerable length, & tied it w^th a few straps, the Cure was so complete that in some months he could step into a Chaise, or could walk up stairs without any great difficulty, tho for the first 2 or 3 months he scarcely ventured to use the full force of the Joints to bend it much, now this treatment is equally proper for the Laceration of any other Tendon, as y^e Tendo Achilles, & what happens to y^e Tendon happens likewise to y^e belly of the Muscles, I've seen several Cases where there were symptoms of a breaking of parts, & yet the Surgeon mistook

the Laceration by attending only to ye state of the
Tendon, here the great matter is to relax ye muscles,
& to keep the Lacerated parts contiguous in a
steady way. In this Joint it is evident that the
Extension of the foot is the first & principal
way of relaxing, but there is another thing ne
cessary wch has been overlooked, ye the outer Joint
of the Knee ought to be likewise bent to relax the
Gastrocnie Musc. Externus wch comes from ye Thigh,
so this is the proper posture during the Cure,
whether the Patt lies sideways, or upon his
back, it makes no materiall odds to ye state
of the Muscles, but ye Knee must be bent.

My Father, who was a sufferer himself, has
described a method of drawing the parts to-
gether, he had a Slipper of Lemon to fit the foot,
& wch tied wch Strings, & it was open at ye toes,
for the pressure of the leg against the Toes
became intollerable, there is likewise a strap
behind for drawing the foot into the intended
posture. next the applied a piece of cloth, +
fitting it exactly, by wch he had a firm hold
+ to the leg

of the muscles, & he fixes this by means of Buckles,
he then extended the foot, & drew down y^e belly of y^e
Muscles, & pulling the straps he kept it extended,
& further he kept the foot from falling, or to
guard against any improper motion in time of
sleep, a piece of Tin was tied about the foot &
Leg, tho' unless in time of sleep this is not nay

After the Tendon had got a sufficient
degree of firmness[†] all the effects of posture,
& avoid all the actions y^t stretch it, bringing the
stress upon the sound leg, & when the Patient
begins to walk he uses very high heels to his
shoes, gradually lessening the height, for the
more particular directions, see y^e Med^l Essays,
where you have an acc^t of these Instruments.

Now y^e Directions mentioned in y^e 2^d Case
apply in a general way to y^e Laceration of Tendons
universally, or y^e division of them by wounds, we
relax the Muscles, or suppose they are wounded,
if I can cure a Tendon under the Skin without
seeing the parts, in the same way I will cure
a Tendon exposed by a Wound, but if wounds
Tendons

† let the Patient consider

Tendons notwithstanding attention to posture,
will not mend accurately, Tis no objections to
the Sewing them, you will find Surgeons very in-
consistent here, in the same Book alledging y^e
utmost sensibility & dreadful symptoms attend-
wounds of Tendons, & at y^e same time recom-
mending y^e Sewing them in y^e case of wounds.
Next suppose y^e y^e Tendon is wounded in y^e
Sheath +, & it bursts from an effort while we
study Situation, we ought to give y^e Patient
liberty of making motion in a certain way
during the Cure, y^t y^e motion may not be lost.
By in conseq^ence of treatment of this kind
in Fractures & Luxations, any Joint of the
Body grows stiff, or that the stiffness is the
consequence of Disease, besides the usual
remedies employed we have a Box employed
for sweating a member w^ch Vapours, suppose the
leg y^e part diseased, y^e Joint of the knee or
ancle stiff, the Method is to cover y^e Bed or
Table w^th a Blanket, w^ch may be wrapped
about for y^e warmth, & to conjoin y^e steam

+ or that the Sheath of

Then

then there is a peice of the Box w^ch is lined to Tin,
& enough of air is given by y^e swing of y^e head, &
by y^e worm not being directed to join y^e several
parts of it w^th very great accuracy, if it should,
we have a door, a Vessel w^th Sp^t of wine is put
in, or what will answer better in most Cases
the Steam of boiling water, as from y^e end of
a Tea kettle, or we carry it from a Tea Kitchen,
& it may be thrown in by a N^o of Tin Tubes, & this
may be conjoined to the Limbs, or extended to y^e
trunk of the body. I shewed you a very curious
preparation of the Club foot, by this is gently
understood a distortion of the Joint of y^e Ancle,
but it is really at y^e Joint of the Tarsus, & it
is material in the Cure to have this Idea, be-
cause if we conceive the Ancle Joint affected,
we think the Cure impossible, unless we lay
hold of the Leg & foot w^th y^e Machine, where
as it is possible to cure the Disease w^th out
laying hold of the Leg foot at all. The Rotation
of the Leg is performed by y^e Os Naviculare on y^e
end of the Astragulus, the other Joints con

conspiring less or more, particularly the
Cuboid moves in the Os Calis, & all the
others in a small degree, now in several cases
of that kind the Complaint is born with us,
& generally the foot is so loose at y^e^ place of
the Rotation, that you can turn y^e^ points of
the Toes inwards at a right angle, so y^t^ the
Toes of the two limbs come to be in a streight
line, but tho' we can at once bring y^e^ foot
streight without the child perceiving pain, and
can hold it for some minutes in y^e^ posture,
so y^t^ y^e^ whole Disease seems to consist in a
Relaxation of the Ligaments, if the Complaint
has continued long, the natural shapes come
to be altered, & in every one of the Bones there
is a material alteration. Now this gives a
suspicion that there may be an original want
of shape in some cases. upon the whole, if we
can bring the foot to a streight line, suppo-
sing even an original fault in the shape of
every bone, that would be much corrected
by keeping the foot in y^e^ common posture &

& we might at least relieve y. Part greatly.
In some cases along w. y. distortion inwards,
there is a complication of distortion upwards,
y. y. top of the foot rises convex, so y. we must
here also press y. convexity downwards, make
the sole flater. Means have been proposed by
Chepelden, w. will in common cases certainly
fail; he proposes to bring the foot to its pro-
per posture, & to apply linnen covered with a
paste of flour & water to prevent y. motion.

Now this will not answer to press down
the curvature, & we attempt too much at
once, for tho' we can bring the foot to its pro-
per posture after a few hours this may give
great torture, so we ought to proceed by steps,
besides, Surgions endeavour to treat the Part
separately, without having y. Idea y. y. one is
the best antagonist against the other, whence
two shoes should be fitted to y. size of the
Patient, & the top of the shoe to draw with
buckles, in order to press down y. convexity.
Next they should be fitted to the same
part

plate of Wood or Metal, & to have a Centre pin at the hill, & there should be in the plate a No. of holes. Sometime after I thought of this I was called to a Patient labouring under a Complaint, & found y. some person had been before me in the very same Idea, for the Father brought me out a pair of Shoes w.ch he had got from y. west of England, the two Shoes were joined together by a piece of Metal w.t a Centre pin, & y. Shoes were made to play upon it, & a No. of small holes were made in the Circumference, so that the foot could be turned out gradually, and brought nearer to a streight Direction: this was tried in that Patient, but the Disease had continued too long, so that after a trial of some months, it was laid aside w.t little benefit, & by pursuing this Idea we may do all that art admits of.

Lastly I am to explain the Dressings after Amputation —

Suppose amputation done in the knee we cover the Wound w.t Lint to a

— curtain

urtain thickness, then we put on a compress of Tow drawn out in y^e simplest manner, w^ch adds to y^e warmth, & serves as a defence to y^e Stump. Now formerly to support these Dressings & compresses was imployed named the Mattia Cloth, it consists of several peices of Linen sewed together, & then cut from the Corners, but when you apply this, the thickness becomes in some measure unequal, & there is a greater thickness on the parts than is generally necessary, so we now substitute in y^e peace of that, two bills of Straps crossed, the breadth proportioned to the size of the Member. I am next to apply my Bandage. Some ingenious Surgeons have talked of applying thick Compresses along the Courses of the Vessels w^th double headed Rollers w^th the view of Checking Hemorrhagy, but in the most common way of applying these, they rather increase the Hem^y, because they affect the Veins more than the arteries. So in amputation, when the Tourneque is drawn to the

full

full tightness, you stop bleeding, but if you slacken it a little it bleeds, because the veins are more affected than the arteries, so these Bandages are all to be discarded from Practice. We take a single, some choose a double headed Roller, we begin wth a Circular or two to support the Dressings, now what ought to be y^e after turns Surgeons fix the Roller wth a pin when they begin to pass over y^e end of the stump, then perhaps make a Circular till they come to the other side, & if they want to have any thing very fast they put in a second pin, & repeating these turns they make more ascents on the Stump, till they give the Bandage a tollerable neat appearance, now the effect of these reverse turns is evidently to draw y^e flesh upwards, & we could not do any thing that would more certainly have that effect, so no reverse turns should ever be thought of, & the only use of y^e Bandage is to support the Compress, we have only therefore to make a few turns to the very bottom, coming from above downwards

wards, & then we pin. & the same objections apply to the double headed Roller, w.ch by making a stronger compression, does still more hurt, then we ought to have nothing more than a slight Cape, or a piece of Stocking, which we apply over the Dress.ing, & we put on a Garter to secure it, or we begin a few turns of a Bandage, above & roll downwards, if the Bandage is to be applied to the Thigh, from the Conical shape it is in danger of slipping, so it is necessary here to tie the Strap about the Pelvis, & to bring a few straps down to pin to it, or the Patient may put on a pair of Drawers, w.ch the Thigh stit before, & joined by a Lace, & to prevent him from taking Cold he should have a waistcoat made before the Amputation.

Next when the Thigh is amputated, to prevent its being Pyramidal we are with a Strap to draw the opposite sides of the wound together w.th the Sutan needle & cord. It is evident from this that the Patient must suffer a vast deal of pain, nay we dis

dis appoint the very intention of this practice, for the Course of the Retraction is the Cause of Inflammation, & we increase this by g. wounds we make, so we ought to accomplish this end by bandages properly directed, & there is a possibility of doing this without using very much force, we begin the Bandage from above, and so roll downwards, & we use a Plaister Bandage in this manner, & if this has not sufficient effect, we apply 2 or 3 peices of Paste board upon the Thigh in different places, then a Plaister Bandage over all, whereby we push down the parts as much as possible, or as can be necessary. The only other step position is that the common method of securing the Vessels is ineffectual, in such a case it is necessary to maintaine a pressure upon the mouths of the Vessels, & perhaps besides to apply some astringent substance, tho' the effect of these is less considerable than is commonly supposed to be. The bleeding of the large Vessels, stops from the Coagulation within the circulation of the blood

within them, from its being exposed to the air.

Next the vessels have a living & muscular power & they draw together by means of that, & a 3d. means is a swelling of the neighbouring parts, wh. mechanically presses against the artery. The astringent is of such a nature as to dispose the blood to coagulate more firmly, but the effect is not very considerable, so when such substances are applied, they act rather as Compressed, & in that view we employ with some advantage the Agaric of the Oak, wh. makes a very compleat Compress, & it has besides a small degree of Elasticity, & we use a piece of dried Sponge, wh. sticks to the part, the pores of the Sponge are of such that way, the flesh enters into them, & in getting wett it swells considerably, & in that way stops the bleeding vessels, & the blood may clot upon it more readily, just as the putting threads into a Solution of Sugar, we form Crystals more readily suppose than that the stopping of the vessels

fail

fail, or that we do not incline to employ Caustick or Caustic, or Actual Cautery because of the Injury they do the Vessels, & that we use the Agaric or Sponge, & put a small piece on the mouth of ye Vessels, then a larger, & so on till we raise it higher than the rest, that the pressure may be upon it, then we are directed to apply some Substance that shall compress powerfully, as that proposed by Gooch, it consists of a Circular round the trunk of the Body &c. Straps from it inclosing the Thigh, & applying a plate to the Stump, we secure it by means of the Straps, now that may be done with a common Tourneque, especially where the operation is under the knee, in a better way we first apply a Tourneque to the course of the artery, & increases the pressure till ye bleeding ceases, then wiping the place clean we apply Agaric, or a Sponge, & perhaps that sponge is rather bitter, & taking the common Turnag, & cutting away the Roller, we apply it to the end of the Stump, we then roll a Garter above the

† This is a milder kind of Caustic

the knee, turn the Strap down & pin it to the Garter. & by turning the Screw we make the pressure upon the Ends or meeties of y. Vessels.

Having allowed the compress to settle, we gradually slacken the Turnequet, & generally an application of 20 Minittes will be suffict. but I only recommend this practice when others fail, for many Patients in this Island have lost their lives trusting to Compresses instead of Ligatures, now y. Sponge becomes at length so stuck so closely to the Part, that Physic is puzzled how to remove it & recommends that we should destroy it by Caustic, but that is owing to its being allowed to remain too long on the part, when the Granulation runs into the pores of it, so that they may be covered altogether, which in time may occasion very troublesome Fistula. we should therefore remove it in 3 or 4 days, or at most at the first dressing, which is in general at 5 or 6 days.

Having thus shown you the

several

several Instruments that may be necessary, I would make the same observations that I did after the Operations, that if the manner of using these, & the Reasons are understood, with the Anatomy & situation of the muscles, you can have very little difficulty in treating any case, but will be able to adapt the treatment to the nature of the part affected.

Lecture 117th

Comparative Anatomy

Having fully considered the Structure of the Human Body, & as far as could be done with certainty drawn from the Demonstrations, endeavoured to explain the uses of the several parts, & showed many of the Changes produced by Disease, & the application of the whole in the Practice of Surgery, it remains only that we attempt to throw some further light on the

the Latent operations of the Body, by a Comparison of the Structure of other Animals with Man, & whilst by the Comparison we attain this end, & satisfy our own Curiosity, we observe at the same time the reason of many names & detect errors which have been introduced into practice, & are further enabled to examine many of the Operations, wch are only to be discovered in Living animals.

But it is evident to you, Sr, from the Gradation of Nature, as well as from the variety of Animals, that a necessity arises of making a proper division of them into Classes, for otherwise our Labour would either be endless, or would not give a sufficiently comprehensive view of the whole.

Hitherto no Division has been attempted in the order wch may be called Anatomical.

The Writers on this Subject have contented themselves with dividing them from External marks into Classes, & as the System of the celebrated Linnæus is the most generally

generally followed. I shall begin w^ch. giving a very gen^l. Idea of the principles on w^ch. it is constructed, referring you for more particular and to the Professors of Natural History —

We find y^e. Animal Kingdom is divided by Linn: or by y^e. most accurate Writers in the very same manner, that we in common discourse divide into Classes. on the slightest reflection you know y^t. third is a large Class called Quadrupedes commonly, but we may observe y^t. some of the animals we consider commonly as Fish, the whale kind give suck to their young the same manner as the Quadrupedes. therefore instead of using that term we call the first Class Mammalia, those that give suck to their young. comprehending the whale w^ch. y^e Quadruped. or Anⁱ. of its Extraordinaries, in w^ch. it is evident y^t. Man is included.

The next Class comprehends y^e Birds, after that we find a Class of animals often living like the two first or air, but possessing the

the power of living longer than they do at least in water, so we name the 3d Class Amphibia, after these we add a Class of Fish, wch is y 4th & a vast No of Animals, most of them extremely minute remain, wch are divided into Insects & Worms, wch divis on is made universally, & under one or other of these 6 Classes all the animated beings may be perfectly well arranged.

Next it remains that each Class shall be divided, & subdivided, or a Dictionary of it so constructed, that we may find out readily any Individual, if we have the description, we may find the animal, or if we have the animal, we may find the Description in case, so the Class is first split into Orders, then the Orders are divided into Genera, or kinds of Animals the Genera into Species, & the Species consist of variaties, or to give some general Idea of this take the first Class of Mammalia or Quadrupeds, you all will know y a No of Animals agree in their make & manner of life, the Cow &

& the Sheep, & a great many others, ~~have~~ have a general resemblance of these, when joined together we would constitute an order, or we observe y. there are many Beasts of prey w.ch we join together, possessing swiftness, shape & organs capable of seizing and tearing to pieces the prey, they agree in a variety of circumstances, we then divide y. order into Genera, the Dog or Cat may be referred to the Order of Feræ or wild beasts, so the Cat kind makes one Genus, the Dog another, then we observe different kinds of Dogs & Cats, the Lion is one of the largest of the Cat kind, or we divide the Genus in to various Species, thus the Dog comprehends the Wolf & the Fox. next the Species may be divided very fitly into varieties. You all know y. variation of the Dog kind, & w.ch respect to Varieties I would observe to you y. there seems good reason to suppose, that these are much more distinct than many eminent Naturalists suppose, look into Buffon, & you find him

proving

giving you a Tree explaining all the variety of Dogs, w^ch he adduces from a single kind, varied by Soil, Climate, & accidental circumstances, supposing the various kinds we are commonly taken notice of, have all proceeded from a few original kinds, now I doubt that this is without proper foundation, nay I would alledge y^e Buffon refutes himself by that very accurate enumeration he gives, if the variety of Dogs depends upon y^e circumstances he proposes, how comes he to find y^t there is a certain N^o only, y^e N^o should have been endless, & considering the succession of Ages, he should not have been able to have formed any distinct Tree, & yet every person at least in y^e same Country can very nearly enumerate all the different varieties of the Dog, as they are more invariable than we are aware of, & are nearly as fixed, tho' not altogether so, as y^e Genus itself, & perhaps what we may alledge of y^e Varieties of one Genus of Animals, may apply to all without exception. I avoid saying what I

might think probable of man, but I am impressed with Ideas from the analogy of the mixture of Black & white is less vigorous than the original of either, & probably it would be found that after a certain period of years, the mixed Breed would entirely wear out, this seems to be the Case with respect to Dogs, they can generate a certain No. of times, but after that the spurious breed wears out, & hence the varieties comes to be marked so plainly.

Having endeavoured to explain the Divisions & subdivisions if may be necessary, let us see on what principles these are constructed by Lin. in the different Classes, & following his order we begin with

Mammalia

There is no difficulty of separating one of the orders of Mammalia from all the rest, the whale kind we swim in water by the assistance of the Tail & Fin, in other respects agree in structure with of Mammalia.

The

The remainder of the Quadrupeds including Man, is divided by Linn: into 7 different Orders, from observing the number & figure chiefly of the Dentes Incisores, but calling to y.e assistance y.e Construction of the other Teeth, but unluckily Linn: in describing his Divisions has laid down a Rule to w.ch he ought to have paid no kind of attention, that we ought to begin with Man; whereas if we confine our view to the Anatomy, or merely to external marks, there is no reason for pre-eminence, but we may place the Order containing Man as may seem most convenient to retain the Divisions in our Memory, by deviating from this you'll find a confusion introduced because Man possesses accidentally a number of Teeth &c. is intermediate, for some of the Orders are distinguished by the want of Teeth in the fore part of either Jaw, then a smaller No.r only, then &c, then &c, the shape varying in the different Orders then there is an Anomalous Class comprehending the

+ are given to one Jaw

some animals, w^ch tho otherwise agreeing, yet evidently differing in y^e appearance or N^o of Teeth. now if we proceed from y^e worst of Teeth to the highest N^o & ascend gradually, we recollect y^e Division perfectly well; or if we reverse the order, but if we break in upon it we are lost in y^e Confusion. without saying anything of the names he has applied very properly. So he has 3 different Orders, one called Bestiæ, another Bruta, a third Bellicæ, names so nearly alike, & used in so vague a sense by y^e Roman Writers, that we cannot well apply them, nay the term of Bellicæ is not applied to the Elephant, but to the Order comprehending the Horse. I shew you Examples of the different Orders of Ani. beginning with Man who has 4 Incisores, & other Ani^s resembling him called Primates, then we have the Bruta comprehending y^e Elephant, or the Order where y^e Teeth are wanting in y^e fore part of both Jaws, then we have different Examples of the Feræ, where we observe 6 Incisoris, but these differing from others in every

being sharp fitted for laying hold on & for tearing.
Next we have Examples of the Bestiæ we are
an anomalous Class agreeing in the most ma-
terial Circumstances, but y. Nos of Teeth vary
ing in different Genera. after that we have the
Glires, comprehending the Hare, Rabbet &c
w. have two fore Teeth. Next we have y. Pecora
where y. Incisores are wanting in y. upper Jaw,
after that y. Bellicæ as the Horse, where there are
6 Incisores in both the Jaws, but different from
the Fera in their being worn in the edge instead
of rising into sharp points. —

Now if he had begun w. y. Bruta, as
the Elephant, where there are no Teeth in either
Jaw, then taken the Pecora, where y. under
Jaw is furnished w. Teeth, but they are
wanting in the upper, then the Glires w.
have 2 fore Teeth, then y. Animals w.
have 4 Teeth, comprehending Man, or the
Primates of Lin: then the Fera & Bellicæ
of Lin: our recollection w.d have been easy.

The 2d Class, the Birds are divided
in 6

into 6 Orders, the Accipites, Picæ, Anseres, Grallæ, Gallinæ
Passeres. the distinctions of the order are drawn
from the Beck, & tho' at first sight there is a diffi-
culty in understanding it, it is conbracted on dis
tinct principles, in so much t^t Lin: has uniformly
retained that division thro' various Editions,
tho' he is abundantly ready to correct any thing
inaccurate.

The 3^d Class comprehends Amphibia. now
this Lin: has divided into 3 or 4 Orders. 3 Orders
are sufficient, admitting y^e gen^l Circumstances
on w^ch he makes his division. The first Order
comprehends the Reptiles pedati, Animals
that move more slowly than y^e Quadrupeds &c.
just, & this we observe comprehends y^e Tortoise,
the Frog & Lizard. for the Draco is but a
Lizard with Wings. The 2^d Order comprehends
the various kinds of Serpents. now these 2 take
in all the other Animals that by other Authors
have been called Amphibious, but Linnæus
has added a 3^d Order, the ~~Nantes~~ Nantes finnati,
how far he has done so properly can only be
under

understood when the anatomy is known. the Scate is reckoned in the number. orein gen.l this Order comprehends what former authors have called Cartilaginous fishes, the flesh of w.ch is supported by Cartilage in place of Bone

The Fishes. the 1.st Class of Lin: he has removed from it the Cartilaginous fishes, & y.e rest are divided by him into 4 Orders, for y.e situation of the Pectoral Fins, or as he calls them, the Pinnæ pectorales. The fish moves chiefly by the force of its Tail, but it has other Fins standing out transversely, by means of which it turns its body in different directions. Others again are added to hinder it from falling sideways, as on the back or belly. now these on y.e belly are its feet. the fish rests upon them, spreading them out broad, & Lin: attends to y.e situation of the Ventral fins respect to y.e pectoral & if they are farther forwards, he calls the Order ~~Fulgulares~~ Jugulares, but if they are under the pectoral he names them Thoracici, & if they are towards the Belly Abdominales, so he has constructed 3

Order

+ than the pectoral

orders, then he finds another Order where the Jaw or Ventrical fins are wanting, & he calls that Order Apodes without Jaw a 5th Order remains where there is a want of the flap w.h covers the Gills of the Animal, & he calls them Branchiostege. Now there is some difficulty in reducing a fish even to its proper order, for it is difficult to know how the Ventrical fins are placed with respect to the Pectoral, so this device cannot be called is more correct. See page 161,

Clavis Artedi

We

We now proceed to the smaller animals, the Insects & Worms. Linnaeus divides the Insects into Orders chiefly from attention to their wings. If they want wings he throws them into one Order of Aptera, w.ch makes his last & might as well have begun w.th it. Then we distinguish the winged Insects from each other by y.e No. of wings, by y.e covering of them, or by y.e appearance. There are many Insects w.ch fly, and yet when they are creeping they walk on y.e feet, & we do not observe y.t they have wings because the wings are concealed by a horny sheath, hence there is room for forming the Order of Coleoptera, or wings sheathed, but in many the sheath is incomplete, or there are double wings, for the sheath serves in some measure the purpose of the Substance underneath, and hence the next order is called Hemi[illegible]ptera, but it needs some additional word to give it an Explanation. Next you know y.t if y.e wings of the Butter fly be touched, a powdery matter separates from it. If examining this w.th Glasses we

we find Scales laid over each other in a gen: way,
representing feathers of a Bird. hence Lin: com-
prehends such Insects under an order called
Lepidoptera, wings covered w: Scales. Now
in the wings of many Insects there are threads
running a cross for the support of the wing to
give it a greater firmness, these therefore Lin:
has called Neuroptera, but in many Insects
the Wing is smoother, more resembling a
membrane; so he uses the term Hymenoptera
the membranceous wings. Now so far all the
Insects comprehended under these Orders have
4 wings, considering the Sheath as serving
some what the purpose of wings, but there are
a consid^e N^o of fly w^t 2 wings. only without
Sheath covering them, so these are called Diptera.

The Class of Worms still remains. &
these are divided in the following manner.
all Animals have a Sack or receptacle within
the body for receiving the food. now in many Worms
the body represents the shape of a Sack, but
other Worms tho' equally soft in texture
have

A on the wing of a

have an irregular shape, have limbs or parts projecting from them, we find room therefore dividing the soft Worms &c. Mollusca into 2 Orders, the first is called Intestina resembling a part cut off from y. Intestinal canal of a large Animal, & we make a 2d. of Mollusca Artubes in structa, meaning merely any thing projecting from y. body, as the horns in the Snail. Next there is a large order of Worms in w.h y. soft substances is covered by a shell, the Mollusca Testacea, & we may sub divide this Order from y. No. of y. shells, or the shape into the Univalvia, & the Multivalvia, in some again the shell is Spiral, while in others it is of a differt. shape.

But still a great number of animated Beings remain, w.h are not reduced to Methods, some of them have very regular figures, almost like the horns of a Stag, & w.h regular cells in every part. Now when these are examined in the Sea, we find connected with them living Animals. vide Ellis's very curious

curious work on Corals & Coral Lines.
Of these Substances Lin: institutes 2 orders,
he calls the first Lithophyta, & 2d. Zoophyta.
Now by the first the Stone plants he understands
a Substance constructed by Animals nearly in
the way the Wax is constructed by Bees, but in
stead of extending this Idea to the Zoophyta,
he conceives them where they have a resembl
ance of Stone plants, that a seed is sown, &
grows into the appearance of a plant, but
when it comes to flower, i.e. i.e. flowers are ani
mated Bodies. Now how far that Idea is to be
admitted I shall consider when I come to speak
of the Anatomy of the Kasp. It may be worth
while to shew you the figures of the common
Polypies taken from the Philos: Transactions,
we observe i. manner in w. it propogates,
i. a No. of i. heads proceed from one body, i.
besides the spontaneous propagation in
this manner, it is a fact well known i. we
may divide it into any No. of parts, & this it has
a head & tail different in appearance from
each

each other, y. head an organized body very curious
w. a N. of substances for laying hold of its prey,
like y. snout of an Elephant, yet all y. parts of
the animal are renewed. If we cut it transversely
y. head forms a tail, & y. tail gets a head, or
we may cut it longitudinally. I have spoke
formerly of the Tenia, & I doubt whether it
was possessed of such power of adding to the
N. of its Joints. I showed you a most per-
nicious animal that fixes its self in the ali-
mentary Canal of Horses.

By dividing Animals into Classes
orders & Genera, we are enabled by selecting a
few examples to give a gen. Idea of y. structure
of y. whole, & following y. order I have menti-
oned, I begin w. the Mammalia, & tho'
a contrary Method has been observed by
Authors, we would have done so, because we
have already fully examined y. Human Body,
one of that Class.

A Naturalist ought perhaps to have
taken a different Method, beginning w. the most
simple
& or an Anatomist pursuing the study in a very different

simple Structure, he could gradually ascend, nearly inverting the Order of Linnaeus. Now as we are fully acquainted w. y. human body, there is room enough here for a few Cursorry Remarks, especially as I avoid detaining you by showing you matters of most curiosity, unless we can make some application of them, or y. we can throw some further light upon y. human Structure or Philosophy by attending to them. In the first class the first thing to attain us will be y. digestion of the Animal, for they agree in every Essential operation, in the manner of taking in the prepared nourishment, of circulating it, or the operations of the Nerves. But in the Digestion there is room for a great deal further inquiry. That Man is intended by Nature for a Mixture of y. Vegetable & Animal food appears from the Structure, whether we attend to the Organs preparing, or those receiving food, or to the Animals y. agree in Structure, or to y. practice of all Nations.

But other Animals live in a more equable man

manner, using only one particular kind of food, many feed not only on Vegetables alone, but on certain parts of Vegetables viz. foliage chiefly whilst others never taste of it unless compelled, or a habit contrary to Nature has been introduced. so we would compare viz. Herbiferous & carniferous animals wth. Man, & we shall take 2 orders as remote as possible, viz Bruta of Lin: & the Ferd, wch joined to man serve to illustrate the manner of Digestion in the whole class.—

Examining the Bruta we find y. Teeth all together wanting in the upper Jaw before, in y. under Jaw we find them thick set & sharp, looking duperpendicular into the mouth, the Dentes Caninei are wanting, the Molares are numerous, have a No. of sharp points & edges, and the enamel disposed in perpendicular plates. If next we apply the finger to the Palate, & to the Tongue & throat, we observe a number of transverse Rugæ, wth. y. points turned backwards, so y. we can upon the whole determine from

the

the Structure, the kind of food the animal is fitted for, the upper Jaw is fitted for laying hold of foliage or Grass, & lys a little to the side of the head the Grass is readily cut away from its root, the Molares are evidently intended for a great mastication such as the foliage requires, & the parts are so disposed as to bring it back into the Throat. Examining the Dog again we find the fore teeth in both Jaws remarkably sharp & of them, & behind them very long Tusks, from wh our Teeth are named Canini, farther back we find a No of very strong Molares, sharp on the edges, made for cutting & tearing, but then the crust of the Enamel is upon the surface, it covers the whole surface, & is not made for such constant use, as the former order, or we may determine from viewing the Teeth that he is made for the cutting of flesh, & he is capable by the strength of the Teeth & Muscles of the Jaw, to break the Bones of Animals. In this respect the dog is void of Lymphatic Vessels in some

some measure the purpose, not only of anatomy but of Medicine, by pointing out the animals w^h feed on Vegetables & w^h we may take to y^e greatest safety. When next we compare Man with these 2 orders, it is evident that he steps in betwen them, & y^e upon y^e whole he approaches most to the Carnivorous animals, we find his fore teeth sharp for cutting, tho' they are not so well calculated for y^e tearing to pieces, nor is that necessary, then the long Tusks in miniature, & our Mollares are made for grinding, they are sufficiently fitted for dividing flesh, but they differ from those of the Dog in being much flater, & they are equally ~~calculated~~ for grinding, particularly the more prepared kinds of Vegetables. so we would conclude that Man was designed for a mixed aliment.

We trace the food farther down into the throat, & here we find a circumstance or two y^e merit attention. In the Quadruped the Uvula is wanting, in Man it seems to be formed on account of his erect posture. to prevent the food

food from falling by its weight down into the Lungs. it serves as a Monitor, that when the Bolus is brought back the Throat may be irritated & the Glottis may contract to prevent it from entering; so the Uvula is more sensible than any part of the Velum pendulum palati. now in the horizontal posture of other Animals y. danger of this is not so great, but in the Quadrupeds we find y. the Epiglottis has a Muscle for raising it as they swallow the food more voraciously, & from its nature it is more apt to stick and entangle the Epiglottis, while Man can give assistance w. y. finger if a piece of meat stops in the Glottis he can reach it w. y. fore finger.

Next pursuing the food into y. Stomach, we shall first as coming nearest to ourselves, observe the Structure of the alimentary canal in Carnivorous Animals. In raising y. Stomach of the Dog, w. is larger in proportion to the animal, y. is more evidently muscular than in Man. Next we follow y. Intestinal Tube, w. is wide down as in Man at the upper end

go on

for supporting the Stomach. when it floats loose
makes a large turn very different from y^e human
& is brought back again to be tied pretty closely
to the Spine, so in the Horizontal posture y^e food
must ascend contrary to its weight, & in an
erect posture somewhat of the same kind hap-
pens. So Nature evidently intends to re-
tain the food in the Duodenum, as undergo-
ing particular changes in that organ. we
observe the Gut thicker than ours, & it possesses
a power of contracting very considerably, the
Intestine is also much shorter than in man B
where the small Intestine ends in the Colon,
we find a long Int^m Colicum, & in some animals
this makes a vast number of very intricate
turns, in the Sow it makes many Spirals,
then the great Gut makes a short turn. in
the Carnivorous animals the Sigmoid flex-
ure is wanting, & where the small & great
join together, there is no very accurate Valve,
so we are not to apply, what we observe on
Injecting air into the Intestine of a Dog &c to
B while in a Sheep it is vastly longer & the coats are less
muscular than in man

to the human body, on the whole therefore we
observe y. the Alimy canal is much shorter, but
more Muscular than in Man, & y. y. Stomach
is more Capacious, wch is rather perhaps from
a necessity of Nature, the Carnivorous animal
not having always the food at hand, the thicker
coats of the canal seem to be especially in-
tended for the more accurate expulsions of the
Contents, & we find here a vast deal of fleshy
substance to defend it against the putrescent
nature of the food, as well as against the sharp
substances Animals take down, the assist-
ing Chylopoetic Viscera of both kinds have
a similar Structure, & the whole are covered
with a long extended Omentum wch reaches to
the Pelvis, while in the human body it scarcely
reaches the Umbilicus, wch clearly points out
the intended difference of posture, we can take
out the Pancreas with more ease in the Dog
than in Man & tie it, & hence there was room
for De Graafs Experit the Liver is only
divided into a greater number of Lobes, on
account

account of the slight motions of the Animal, & the Lobe in which y^e^ Gall bladder is lodged sends as many branches to the Hepatic Duct as any other Lobes, so that in the Quadrupeds hepato cystic ducts are evidently wanting. & the Bile comes directly from the hepatic Duct by regargitation thro y^e^ cystic. Now so much of the alimy Canal, & in gen^l^ of the assisting Chylopoetic Viscera of the Quadruped.

Let us next take a view of the Stomachs of the Herbiferous animals, as that of the Sheep, the Muscular Structure of the Oesophagus is very evident, & following the Tube, we find y^e^ it enters, just where the Sacks join together, or two Stomachs meets, the largest of w^ch^ is on the left side, & it has a very curious structure, a number of Processes which are rounded at the top, & w^ch^ increase the surface of it greatly we call it the Venter or Ventricules, or Inglurios, & it may be compared to the Croop of Birds.

The other Stomach has a still more curious Structure, resembling very much a Section of

of a honeycomb, + or 2d Stomach, this leads to a 3d
Stomach, in wch we find a Nr of beautiful proceses,
& on every one of them a Nr of Capilld, or we find
a Nr of Pli[illegible] & hence this is best named the 3d
Stomach or Manyplies.

Now the last Stomach much more nearly
than any of the rest resembles our own, it has
a number of Valvuld conniventes disposed longi-
tudinally, & wch are more remarkable here than in
Man, then these ends in the Pylorus, & we find
half a Canal leading thro' y. 2d into y. 3d and a
similar passages leading directly into the 4th
(Now you will recollect what probably all of you have
observed, that a Cow or Sheep after feeding
a certain time, lies down, & appears still to be
eating or chewing, & you observe a ball alter-
nately thrown upwards & downwards in
the Throat, the Creature makes an Effort, then
the Ball rises, then chewing a certain time
the ball is swallowed, & the motion is so
rapid that the Eye scarcely follows y ball.
The animal then takes in a sufficient pro-
vision
+ and perhaps the best name for it is the Honeycomb)

provision, receives it into the 1st Stomach, and having lien a certain time, it is brought from the first Stomach up into the Mouth, & we must suppose y. it returns not into the same, but into the 2d Stomach, from y. 2d into y. 3d. from the 3d into the 4th. When drunk is taken we do not observe y. the animal receives the drunk into the first Stomach, brings it into the Mouth, & so back again, but taking a large quantity it first fills the first Stomach, & makes it pass by degrees into y. rest & a Calf does the same w.t Milk, nay it may run directly from the Oesophagus along the Gutter into the 4th Stomach, now we see at once the Intention of Nature in bestowing so many Stomachs, that is to enable the animal to convert the most grosse parts of Vegetables into aliment, that nothing may be lost, & you know that the Dung of a horse w.t does not ruminate, is a much richer manure than the dung of a Cow, the nutritious part being more throughly taken from it, but

but we apply this further side in Physiology.
1st We have the clearest proof of a living principle superior to reason & experience operating upon the active parts of animals, we see the Stomach operating in various ways according to the Utility without the animal knowing more of its inward make than we do. We see evidently that every Stomach possesses a different Organization. Now the Conclusion we would draw here is that we are by no means to conceive that the liquors we receive from the Mouth & Stomach serves merely for Dilution, but that they act as Menstrua, for if a greater extension of Surface only was necessary, the same Structure wd serve in all, but every Stomach performs by its liquors as a Menstruum, a certain Operation, & 15 years ago I made some Experiments, wch put this matter in the clearest Light. After hunging a Dog without food for 30 hours I gave him pieces of the Thigh bone of a Sheep wrapped in flesh having weighed them first, & killing

(next)

from the next day there was not the smallest vestige of the most part of them to be found, so the action of the stomach is much more complex than is generally imagined, & Mr. John Hunter has thrown further light upon that subject in the Philosophical Transactions. [illegible]

Lecture 18.

We have observed that the Alimentary Canal of the Herbiferous Animals is much longer than that of the Carniverous, so further changes need to be made to render the food like to the constituent of the animal & safe to be received, & the changes happening in the last part of the canal are necessary for the crude nature of the aliment in the upper end, & we are yet far from knowing the strength or power of the Intestinal Canal, in the human body I am much disposed to consider it chiefly as an organ preparing slimy matter, but in many of the Quadrupeds, especially those living solely on herbs, we find

find it of very great size, nearly equal to the Diameter of the Stomach itself, in the Rat it is so the full longer than the Stomach [illegible], so a very great deal still remains in every part of the progress of Digestion to be discovered by plain Experiments, by opening animals at different times after that we have given them food the nature of which is known to us. —

The food is taken in here as in Man, & conducted thro' the Lacteals in the Mesenteric Glands, & the only circumstance here is that the several Glands are collected here together near the root of the Mesentery i.e. w.ch is more transparent than in us, the fat following the course of the principal Vessels. Now this circumstance led the Inventor of the Lacteal vessels into the mistake of supposing that they terminate in the Pancreas, hence a term of the Pancreas Ascitj; by w.ch we are to understand the Mesenteric Gland sticking in together into one Cluster, after the Lacteals have passed thro these Glands, they pass upwards in the usual manner

manner like the nourishment gets into the circulating mass, tho' after it gets there we can still see it floating upon the surface of the blood for some time. So Authors who have supposed that the Lungs & other organs contributed much to the mixture of the Chyle w.th the blood, the proceeding on Conjecture have really proposed true Opinions. Next, we find the same gen.l structure of the Heart & the Lungs, only the heart is placed streight almost in the Thorax w.th its apex downwards, & the Mediastinum has its joining near to the Septum Medium of the heart, & hence it is rightly divided into right & left Auricles & Ventricles, whereas in the human body, by the point being turned over these to be improper names, or we find the right is more anterior & the left more posterior.

Next the Heart is at a distance from the Diaphragm, instead of resting on the middle & tendinous part of it, from the oblong shape of the Animal, a large motion of the Diaphragm being necessary to give a sufficient enlargement to the

the Thorax; so here the Tendon to wch ye Mediastinum
is connected has the principal motion, or the
whole of it pushes down the Abdominal viscera
in an uniform way, the Lungs of the animal
are divided into a greater No of lobes to allow ye
parts to accomodate themselves to ye shape of ye
animal, & the greater motion performed especially in bending its Spine, & we may here correct an error wch is apt to mislead one.
When the Lungs of the human body are taken
out, & we attempt to fill them wth air, & to keep
them distended, it escapes very readily, hence a
notion has prevailed ye air passes thro holes
to get betwen them & the side, & in most Classes
of animals, as the Birds, such holes can be demonstrated wth ye utmost ease, & on opening ye Thorax
it has been alledged ye Lungs are not found
contiguous, but that a blast of air is preceded
outwards, even Morgagni has proposed an
Experiment of this sort, & Wambergerus a Physiologist of Germany has pretended to give
an Argumentum Crucis, that if you open the
side

side of the Thorax of a Quadruped & examine the Mediastinum in wch there is no perforation, you can perceive the air between ye Mediastinum & the Lungs of the opposite side, but the fact is, that the lower parts of the Mediastinum of the Quadruped is semi double, there is an opening behind the Vena Cava wch receives a small lobe of the Lungs into the right side, so on opening the Thorax that lobe collapses, & we seem to see a bulla of the air on the opposite side, but it is in reality on the same side, & if we open the left side instead of the right there is no such appearance, besides we constantly find ye Lungs contiguous to the Pleura, & when we open the Thorax under water, not a bulla of air appears unless ye Lungs be wounded —

From ye length of ye Trachea in ye Quadruped Bronchotomy comes to be an easy operation, as we can choose our place, avoiding ye Thyroid Gland, & further the Thyroid Gland is here divided into 2 Lobes, or rather there are 2 Thyroid Glands, Now

Now these in proportion to the animal are vastly
smaller than in ye human body, & this circumstance
renders more doubtful any supposition formed
about that Gland, of its being necessary to the
formation of principal parts of the Fœtus,
we would be more inclined to suppose that
it serves some local office, than ye. contributes
to ye good of the whole. having seen ye. gen.
circulation is the same as in man we would
follow ye. Arteries from ye. heart outwards, and
here we find ye. reason of ye. names aorta
ascendens & descendens, the aorta in some ani-
mals dividing nearly into 2 parts, as in ye Cow
kind, following the circulation we may read-
observe ye. animal has nearly ye. same Ex-
cretions as we have, we find ye. Kidneys situ-
ated in a similar way, but rounder than
in man, where the weight of the other bowels
seem to flatten the kidneys. so in ye. human
fœtus it is rounder than in the adult. and
composed of a greater No. of lobes, by use &
time are compacted together.

(No)

We find here the Cortical & Medullary Substances more evidently separated than in man, but y. same general structure takes place. In the Carnivorous Animal the Bladder is thicker, & more Muscular than in the Herbiferous, yet it is seldom much distended unless when y. animal is confined the Muscular structure serving for a quick & accurate Expulsion, now this proves that the secretion of the Liquors continues thro' life, & that the parts are not merely dilated by their distension. so Dr. Whytt supposes that the blood by the particular nature of it, might solicit the heart to contract as much as by its distension, w.ch I find controverted, but not on good grounds, so the urine when acrid in the morning, solicits more to a discharge, than the same quantity does when it is of a more watery nature, here y. Peritonæum passes over y. whole of y. Bladder, as from the horizontal situation the urine gravitates towards the Diaphragm, while in us it is merely thrown over the Bladder to prevent y. weight of

of the other Bowels from bearing upon it, this too may explain why the high operation of Lithotomy was so long in being thought of, Theory not leading to this operation, so hitherto the human structure was imperfectly known.

The Excretion by the Lungs is nearly y^e^ same here as in us, as also that by the Skin, there is however a Circumstance of very great curiosity takes place, particularly in the Dog kind, y^e^ they perspire we know from the particular smell, which all animals have, & that one Dog can readily trace another by the smell, but it is impossible to make a Dog sweat, instead of it he discharges a vast quantity of Saliva from the Mouth, so this leads to doubt whether perspiration & sweat be discharged from y^e^ same Vessels, or we are to consider sweat as a Secretion performed in a very different manner & w^th^ different Effects. Further it will be found y^e^ the Dog kind alone are liable to the Rabies w^ch^ we commonly name Canina, now whether are we to suppose that these 2 Circumstances

are

are connected, that if animal is disposed to discharge thro' if skin, it has been alledged in proof of this, that those persons in ye warm climates who sweat ye most copiously, are most exposed to the most dangerous fevers, & supposing the Rabies to have been communicated by a Dog to 2 others, to a Dog, & I suppose a Cat, probably the bite of the Dog would be the most dangerous because of the ~~original~~ natural determination wch ye acrimonious parts of the Saliva seem to have to the Salivary Organs.

We are next led to the Nervous System, & we observe ye N.S. of Man in wch impression is made is ye same as in Man, & Juling excepted, ye several Senses are more acute, the Taste, Smell Hearing & Seeing in general, or in some individuals possessing one or all of these powers in a higher degree than we do, the use of their doing so is abundantly evident, to enable them to find their prey readily, to wch we are directed by Reason, & ye want of power of making ye same Experiments, to judge of the safety of Substance

A disease from the want of this

to be taken, may we can go farther than y^e finall Cause, we seem to observe y^e Structure on w^ch that depends. In the mouth of the Quadruped there is a N^o. of Papillæ disposed on y^e inner side of the Cheek, as well as the Tongue, so y^t the surface of the organ of taste is more extended. In the Nose in a still greater degree, we observe the same thing in a Sheep or Dog, there is a very curious Convolution of the Bones, from w^ch we understand y^e name of Ossa Spongiosa turbinata, now without saying what perhaps is true, that every part of the surface of either organ has a more acute feeling by its Nerves, the extent of the organ is greater, the Impressions multiplied, & this has nearly the same effect, & the increasing y^e Sensibility of the Nerves, just as we smell more accurately w^th two Nostrils & see more distinctly w^th 2 Eyes. In like manner the Quadruped turns y^e Cone of his Ear directly towards the sounding body, & receives the Impression w^th both Ears at y^e same time, so if you observe a string of Horses

horses in the evening, the foremost has his ears
set forwards, & the rest trusts to their companions,
but the hindermost is attentive & turns his ears back-
wards, & what we observe of the External mus-
cles, we would apply to the Internal, y. these
are turned to that particular action w.h gives
the chain of Bones the necessary tension. In the
Eye too there is a large muscle for fixing it more
steadily on the object so we find a large Mem-
brana nictitans. You will observe y. Lion
is only able by this to separate the Ape
from man, now we have this in miniature,
so that distinction fails him, besides y. pupil
of the Quadruped is accomodated to y. objects
he is in quest of, such as feed on Grass who
in a large field, & see it more easily from the
figure of the Eye, while the Cat kind y. subsists
prey, changing its situation from y. ground
to a Tree perhaps has its pupil perpendicular
next w.ch lets motion than we they shud
the pupil more accurately, by its being fixed
down in 2 points, so if you expose y. Eye of
a

a bat to the light, you can observe a prodigious motion of the Pupil; besides, they are inabled to see by a small quantity of light, from a bright Colour found in y^e. bottom of y^e. Eye, w^ch. throws back y^e rays of light w^t. considerable force, & must impress the nerves more strongly. Next they exercise their Muscles with more strength & Readiness than we do, as the Dog w^ch. can pass over a much greater space of ground without fatigue than we can do. A Question would occur here therefore, are we to suppose the Brain w^ch. we possess larger to serve merely for Sense & for motion? I apprehend we must suppose a somewhat farther, without our being able to conceive clearly what we mean, but the Brain of the Animal is the

medium betwixt the Body & the living part, & other powers than these of Sense & Motion are exercised thro' it in a manner we will never be able to Comprehend, & by a great bulk of Organization the powers

of the Mind are better communicated, modified & extended.

We would consider the manner in which the Species can be continued, by beginning with the Male organs.

In the Dog the Vesiculæ Seminalis are wanting, the reason of this I cannot Conjecture, but a consequence of it is, that the Copulation is tedious, as time must be given for the Semen to be carried round from the Testicles thro the Ducts. Now this shows us that there is some power at one time determining that motion much more than at another, & not the uniform impulse of the Circulation or Vis a tergo, the Cremaster Muscle may grasp the Testicle, but the Tubes themselves must also possess the living power, nay Swellings of the Tubes have been brought on from Passions of the Mind.

The means by wch the Copulation is rendered tedious is very simple, the Animal has a Second Corpus Cavernosum at the root of the Glans penis that is receivd in the Vagina, & the

the Corpus Cavernosum[A] is larger than in other Animals, hence the Animal is retained, and as when they turn averse to each other y^e Urethra is in danger of being twisted, we find a bone in the Penis w^ch a Furrow to conduct the Semen, & wherever we find this bone, we may conclude the Vesiculæ Seminalis is wanting, here the process of the Peritonæum w^ch is found in the human body in the fœtus & old remains even open, so y^t there is a constant communication between the Abdomen & Vaginal coat of the Testicle; the shutting this process in Man evidently shews y^t y^e Erect posture is intended & as the Quadruped rises sometimes erect & there is a degree of danger, to prevent that, a very curious Valve is found, w^ch consists of a fatty substance, & is not exhausted however lean the Animal may be.

Let us next attend to the appearances of the Gravid Uterus, as that of the Sheep, for in it observe the change in the Ovarium. the Corpus Luteum. In the Multiparous Quadrupeds the

A of the Vagina

A) Even this is common to all the Animals of the same kind of Hernia & that does not separate from the Penis when the Testicle

the Uterus has a bor~~na~~ aua, in w.ch fœtus are lodged as well as in y.e body of it, we per-ceive a vast No. of Placentæ & Glands corres-ponding to them in the Uterus before mention'd we find next to the Uterus y.e Chorion, and connected to it the Placentulæ, the mouths of w.ch enters into the hollows of y.e Glandulæ, & from the Glandulæ a milky white substance may be squeezed out, we also find a very curious bag filled w.th liquor, y.e Urine of the Animal, & what has been called Allantois, it is thin & totally without vessels, & there is often in it a half solid substance, a sedi-ment of Urine. We next come to y.e Amnios, w.ch contains y.e liquor in w.ch y.e fœtus swims, now from attending to this structure, it was in for y.e y. Uterus contributes much to the formation of the Placentæ, for it is scarcely to be imagined that a certain ~~quantity~~ No. of them tumbling about in the Uterus, would be so accurately applied to it, & in y.e human body the surface of the Ovum is at first

fully

pretty uniform, & every part of it is equally calculated for forming the Placenta. The manner of connexion of the Uterus of ye Quadrup. to the Ovum is very different from what takes place in ye human body, we find a milky like liquor in the Glands, whereas instead of that we find considerable vessels in the human body entering into the Placenta, so there is a real difference in ye manner of the nutrition, tho' we would prove therefore that there was no communication by circulating vessels between ye foetus of ye Quadruped & the Mother, yet our proof would be far from applying to the human body, & we are more confirmed in this from finding an Allantois containing the Urine in Quadrupeds & in Birds. In the human Body there is an equal necessity for the foetus getting rid of the Urine, yet nothing ~~notwithstanding~~ of it is to be found in the Liquor Amnii, so the grosser Excrementitious parts must pass off into the Mother. (Neal) in the human Subject we can demonstrate

(vessels

Vessels in the Amnios, so we are at a loss to determine whence the liquor Amnii comes, B but in the Quadruped we observe Vessels in the Amnios w^ch lead to little knots, and are derived from the Umbelicial Cord, so this liquor is a secretion by the ~~Liquor~~ Fœtus its self the question therefore w^t respect to y^e nourishment of the Fœtus, whether it is by y^e Umbil: Cord, or by what it swallows, remains, all is derived from the Cord, & the Cord can not be wanting, it is essential to y^e life of the animal, & only a separate question remains, whether the Fœtus swallows y^e liquor Amnii This is a very improbable opinion, & yet the late Dr Fleming found hairs in y^e Stomach of Calves, & he only could observe these when the Calf had got hairs on the skin, but admitting the fact, it does not alter our Ideas w^t respect to y^e nourishment of the Fœtus.

I shall see you that the Lungs of a Fœtus sink in water as readily as the Liver, and look almost as solid, & are of a darker colour, whereas

B some suppose that it is from the uterus

whereas after the air is thrown in, they swim, so by this circumstance we judge whether children are still born, but we ought to be careful that nothing has happened y^t could introduce air into the lungs, as the blowing it in by a malicious person, or its being drawn in by an unguarded motion of the child or y^e parts has grown putrid, when they may become emphysematic and swim, & if the lungs sink & have that dark colour, we ought to conclude that the child has not breathed.

Lecture 17th

The next Class of Animals, the Birds, agree w^th y^e former in material respects, for like it we find four extremities the feathers resembles the hairs, so that the principal outer mark of distinction is the Beak instead of the Teeth, the internal operations are carried on nearly in like manner likewise so that the principal difference is to be found

found in the manner of Generating, that they are all Oviparous, i. e. the nourishment is prepared for the Young before we distinguish it, & the young increase without any connexion w.th the Mother, when we view the outward form of a Bird stripped of its feathers, its Extremities seem ill placed for y.e Ballancing of its body, the legs seem to be too far back, but then the Animal carries its body obliquely, whilst the leg, w.ch in reality is the foot, makes a great angle forwards so the base is thrown sufficiently under the common centre of Gravity. The wings in like manner seem to be placed too far forwards, but then the weight of the Animal in flying is in a great measure supported by the Tail, who that he chiefly used for the direction of the flight. Attending more minutely to the structure of the Extremities, we observe y.e y.e Muscles w.ch manage the wing are vastly strong, & hence we see the variety of Imaginary, that man can be made by any Contrivance to

to support his body in the air, for either of force is wanting, or if the Mechanic powers are called in, & a proper apparatus contrived for striking the air, the quickness is lost

When a bird flies he uses his wings as we do the oars of a boat, & as the long feathers of ye wing are stretched backwards, the body is much better supported than it appears to be, then the Tail spread out, that which it serves chiefly the purpose of a Rudder, it at ye same time makes a resistance, & supports the posterior part of ye Animal, the structure of the foot or what is called the Leg is likewise simple, but exactly adapted for its principal office, for when you extend the foot upon the leg, the Toes are drawn asunder, & set in the circumference of a small circle, & ye extensors of the Toes are so short, that in making this motion they are brought to the full stretch, so on drawing the foot towards the body in water, the breadth is greatly expanded, but on pushing the foot backwards, by means of a lock w^ch is extended between the Toes in ye

(water)

water fowls. the water is pusshed with great force. Again a Bird of prey endeavours to lay hold of another animal, when he descends by claping in the wings he spreads out his feet; & as soon as the Talons fix on his prey, the weight of the Animal shuts the toes strongly upon it, or in this kind of Birds that seek seeds & Insects upon the surface of the Earth, they spread out the feet, & throw a great deal of it off at one stroke. I shall here make my experiment I formerly mentioned of imitating the voice of the Animal by blowing into the wind pipe even after we have made a hole in the Neck, or interrupted the Communication betwixt the Larynx and the Breast. If blow in air, & on pressing out again we have a sound nearly resembling that of the animal when alive, the cause of this comes to be examined in the Course of my Dissection, which we begin with observing

The Organs of Digestion. For this this Animal is intended by nature to feed mostly on

on the way we do, upon the more prepared parts of
Vegetables, w^ch a mixture of animal food yet for
the want of Teeth you would expect some further
~~appearance~~ apparatus. In the Cavity of the Mouth are found
Salivary Organs the inferior maxillary glands,
but we want a covering to the Trachea, & there
is merely a large Rima leading into y^e nose
& into the Larynx, because from y^e want of
Teeth the Substances the animal takes in are
in a little danger of falling into either, going
further back there is a very wide Gullet, & the
Glands of it are much more wid^e than in man,
a vast quantity of liquor seems to be poured out,
from the Pharynx we are led down y^e Oesophagus,
w^ch is likewise large because the food passes w^th
out Mandu^n downwards. We are led to the
Croup of Jowls, w^ch is placed on y^e right side of y^e
wind pipe at the lower part of the Neck, in
the Croup we find liquor poured out in very
great quantity, from y^e Croup y^e passage leads
to y^e Stomach, but without our finding
any particular gutter for conducting the food
di

directly downwards, tho' ye drink may pass directly into the Stomach, & this is opens into the 3d & last. In the 2d Stomach we perceive distinctly a No of orifices coming out from bags, there is no clearer proof to be given of follicles than in this part, bags containing liquor & discharging it from a small orifice in the side of the Bag. In the carnivorous Birds ye 2d Stomach resembles ye of a Dog, but in the Granivorous it consists of very thick muscles joined together by strong tendons, & the whole is lined by a very thick membrane, wch tears off very easily, so the Description by Pliny is a very distinct one, the Ventriculus, Callosus, Carnosique, from this Stomach ye Duodenum comes out in the ordinary way. Hard to judge of ye Act of these several parts in Digestion, we must slit them open & examine their Contents, if the Animal has got the Grain entire, it remains entire in the first Stomach, ye Crop, in passing thro' ye 2d it seems chiefly to receive a Mucous matter, in ye 3d we find the Grain

Grain broke down, & there is mixed w^th it many of the hardest Pebbles, nay without these if you feed them on Grain unbruised, they are not sufficiently nourished. It is evid^t therefore y^t y^e 3^d Stomach supplies y^e want of Teeth, y^t by it the food is triturated, & the effect of it is powerfull beyond what we could expect. Raumeur formed a Cylinder of Iron w^ch he cut into 2 equal pieces, & threw one of them to a large bird, w^ch it swallowed down, & examining y^e Stomach soon after w^ch he found y^t y^e Cylinder was squeezed quite flat & then laid weight upon the other half, & he found y^t it required 130 lb & upwards to have the same effect. now the force of the Stomach was double of this. Raumeur commits a mistake because it made not only y^e pressure, but the resistance, the food then is broke down by force in the last Stomach, but y^e complete digestion of it, the Solution & the rendering it like to the Animal is performed by all the Stomachs concurring in proportions not yet ascertained by Experiments. From the Stomachs

the

the food descends thro a very long tract of Intes-
tines, in the Granivorous Birds in w.ch we observe
confirmed what I formerly mentioned res-
pecting the Duodenum, &c. in all animals the
food is purposly retained in that part of the
Canal after the Liquors of the Bile &c. & Pancreas
are added. from the Situation of the Pancreas
in Birds, its Duct was discovered before we
made the discovery in the former Class about
the middle of last Century, at the end of the small
Intestines we find 2 Intestina Cæca about ½
foot in length, & these are turned upwards
that the food ascends in them contrary to its
gravity, w.ch shows y.e use of Intest. Cæcum is an
Organ of more importance than is comm.ly
imagined, & in the beginning of the great Intestines
of Animals, the food undergoes some proces
not yet sufficiently understood, this too
points out the power of the living principle
over the Organs, &c. these do not act merely
from Irritation being applied, that they do
not act from Necessity because an Irritation
is

is applied in a certain manner, for were this the Case the food would never enter the Intest. Colum, on their mouth being irritated they would shut, but at one time the food is directed upwards, again that motion is reversed when it is fit to be discharged, the Apis Ling Chylopoetic Viscera are the same as in the other Class, we find a large Liver & generally a Gall Bladder, tho Pigeons &c want the Gall bladder. There is merely a variety in the manner in wch the Gall bladder receives its liquor, the Cystic & Hepatic Ducts opening separately into the Duodenum, while the Gall bladder is supplied by Hepato-cystic Ducts

The absorption of the Chyle is performed by Lacteal Vessels in the same manner as in the former Class, only tracing these we do not find Conglobate Glands in ye Mesentery. Mr. Hewson has observed ye ye Lacteals of ye Class never grow white, but ye ye Chyle is colourless the Alimentary Canal of Birds is tied down very closely by membranes on account of ye great rapidity wth wch ye animal is carried thro' the air

air, to keep the Bowels from being shaken.

Next following the Chyle & Blood we find y^e same general structure of the Heart, & the Fowls breath alternately as we do, & may be killed in the same time merely by stopping the Respiration, but the passage into the Lungs are different, we find the true Glottis not in its common place, but at a distance from it within the breast, so y^t we can imitate the Voice of the animal after cutting y^e Trachea, the bottom of the Trachea resembling y^e Reed of a Hautboy & w^h distinct Muscles which makes the true Glottis. tracing the Trachea into the Lungs we observe that a N^o of its branches go thro' them & pour the air into Cells as it were passing between y^e Lungs & Pleura, & from this it has been extended & further than has been commonly imagined. M^r John Hunter has lately observed y^t y^e air passes into y^e Cavity of y^e Bones of a Bird, hence y^e Lungs are supported by Membranes, & fixed in their place that they might not Collapse, the principal use of the air

air thus passing into Cells is to render the body of the Animal especially lighter, & its entering into the Bones serves the same purpose, that its entering into the Composition of a Feather, wch contains air within, whether some further purpose may be answered by this Mechanism, we are yet uncertain, the animal may perhaps be thereby enabled to live longer without respiring, & at the same time a Bird is killed as soon by hanging as the class Mammalia, & the Aorta here divides in a particular way, we find 2 equal branches produced instead of a Trunk, & these again equally subdivided into 2 more, ^ by. an equal quantity of Blood may be sent to either wing, as any preference here would be hurtful, from the Circulating System we find the same general Exertions as in the former class. only the Vrinary descending from the Kidneys open into the common Cloaca, or they discharge the Urine along ^ the Faces, as by. in Birds in gen.l there is wanting the Vesica Urinaria. The Urine has a very singular appearance, it is ~~like~~ the

Chalky

chalky like substance upon y^e Dung of Fowls & such being received into y^e Vesicle Urinaria might have grown into a solid.

We might here inquire why Fowls have the Urine so particular while they seem to drink freely, now we cannot explain that without supposing y^e this appearance is in a great measure owing to the feathers, that there is a vast reparation & waste of an Earthy substance, & a large absorption from the feathers. so in a case where y^e Bones of the human body grow soft for a N^o of weeks, the Urine had a plastery sediment. so I thought y^t if the feathers were pulled off a fowl, we should perhaps find till they came to be repaired, y^e y^e appearance of the Urine would be altered.

With reg^d to the Sentient System very little is to be observed for exercising taste in y^e Mouth we scarcely see long Papillæ, & from y^e want of Manducation we may conclude that Birds possess Taste less acutely in general than the former Class, in the Nose we find a very beautiful

Structure

Structure, the Ossa Spongiosa are very much Convulated, & it is well known y^t Birds smell their prey at a very great distance. In the Ear there are remarkable differences, the Cavity of the Tympanum is very differently shaped & covered, the membrane of the Drum instead of being Concave is Convex, & is supported on an Elastic Substance, & at the bottom of the Ear there are Semi Circular Canals, but it is alledged y^t y^e Cochlea is wanting, but we find the same gen^l Circumstances, a membrane of the Drum, small bones, some Circular Canals & Nerves spreading out upon them, & the 2 Ears communicate under y^e Brain, so y^t while a Bird listens w^t one Ear he is turning both to the Sounding object. In the Eye we observe much more easily here than in the former Class the Sources of the Tears, there is one large Duct w^ch pours them out, they have over the Eye a very beautiful Curtain directed by Muscles w^ch can cover the whole of it, & this is necessary when they fly in the air without protection from the Sun, the Eye upon y^e whole

is

is flatter, & the Chrystalline Lens seems likewise somewhat more dense for colluding the rays sooner, how we find the Membrana coriditans, w^ch shuts the Eye entirily, concealing the whole ball, behind the Crystalline Lens we find a Concave thin substance of a black colour, called y^e black purse, & some have supposed y^t it conveyes or absorbs the dark parts of the Humours, while others again suppose y^t it serves to turn aside objects from falling on the entrance of the Optick Nerve by alt^g the situation of the Nerve, but tho the axis of the Lens are changed y^e focus would stick fall in the same place, so I take the use of it to be that when the animal is to examine objects that are near to its beck, the rays of light fall obliquely upon y^e Lens, y^t they are reflected from it by means of the substance the Marsupium Nigrum, he turns the Lens more perpendicularly upon the Eye, the Brain chiefly is smaller in proportion than in the former class, & we find a great differ-ence in the appearance of many parts which have

have ban supposed prin.ᵖ we scarcely observe a
Corpus Callosum, the fornix is wanting, & y.
Ventricles are differently disposed, & yet y. gen.
powers of the Animal are nearly the same, but
perhaps in an inferior degree, tho' in many
Instances Birds shew a great deal of cunning
& sagacity, so we know very little of y. Functions
of particular parts of the Brain. In the Bird the
decussation of the Optic Nerve is very manifest.

It remains to examine the manner of
Generation, the circumstances on which more
especially the Class differs from the former, &
I shall begin with the Male.

The Testes are situated higher than the
Kidneys, w.ᶜʰ shew y.ᵉ change supposed by
Bourh. to be made by y. Urine is not necessary
before the Spermatic arteries could take their
rise. Following the Vas deferens from the
Epididymis it is gradually enlarged but
without Vesicula Seminalis, the dilatation
of the extremity serving that purpose.
The Vas differentia of the Capella in the
common

common Clitoris, or the prostate Gland is wanting
wch shows yt it is but of secondary use.

Next wt reg. to the Female, you have seen yt
Ovarium or bed of Yolks on yt back bone, and it
communicates wt yt Uterus by yt Fallopian tube,
the beginning of wch is turned towards yt ovari-
um, but it opens wide into the cavity of yt abdo-
men. The Uterus is of the same shape & size of
the Egg, the small end is turned upwards, and on
squeezing the uterus, air gets out at yt great end,
wch is shut by a Muscular substance, & the
passage or Vagina is not exactly in the
middle, but towards one side.

Next let us examine the structure of an
Egg, wch is more curious than perhaps you
suppose it. 1st Between yt Skins wch line yt
shell, at yt great end there is a bag wt air wch
is a little to one side, & the whole shell is lin-
ed wt the same kind of Membrane. next
the shell has within it a great deal of Glary
substance, what is commonly called yt white
of the Egg, & in yt middle of it we find yt Yolk,
the

the Yolk has a white Spot upon it, w^ch is always uppermost, now that is the Sack w^ch Lodges the Chick called Amnios. The Yolk has halazæ or bits of Glare coagulated by heat, if we boil the Egg & cut the Yolk, we find a hole in y^e middle, w^ch was supposed to be the place of the Chick, but it is a mistake, a Chick about the full time of hatching is rolled up so as to take y^e least room possible, & has the Yolk between its legs, & there is a Duct from the Yolk w^ch leads into the Cavity of the Intest: Rectum, into which y^e whole opit passes.

These are the several Facts, let us see y^e explan^n of them, the Yolks form in the Ovarium, & w^n it is connected the Amnios, & they are conducted to the Uterus by the Uterine Tube, w^ch by its Muscular power throws it self round y^e Yolk, causes a particular Yolk to swell & grow large, or rather that after a Yolk has come to be of a certain size, y^e Tube lays hold of it. the necessity of its doing so appears from the Structure of y^e Membrane y^t contains the Yolk, w^ch is like a Tea cup, hence the Yolk must fall into the Cavity of the

Ute

Abdomen, & putrifying might kill the animal in this descent & thro' y^e. Uterine Tube the whole is added to it, just as any soft ball rolled among snow becomes larger, when they fall together into the cavity of the Uterus, where the finer parts are absorbed from the Surface, w^ch. consequently becomes Membr^s. & at the same time y^e. Shell is secreted from the Internal coat of the Uterus, till the air bladder is wanting, y^e. animal by instinct of Nature opens y^e. Uterus and Vagina, & admits a consid^ble. portion of the Atmospheric air, whereby the air bag is formed nearly opposite to the Vagina, how in y^e. place the impregnation is made, or how the male influence is conveyed we do not know exactly, especially if Harvey's Explan^n. is just, that a Copulation is Sufficient to impregnate the Egg for 20 days or a Month, this might lead to the suspicion of somewhat being added to the general mass of Blood. but if y^e. Uterine Tube be obstructed, there is no impregnation, so it either passes up thro' y^e. uterine Tube to

to be successively applied to the Egg bed, or it works within the uterus, & affects the Egg as they descend into it, & that thro' the intervention of the Glan of the Egg after the Conception is made the vessels elongate, & spread and on all sides, then curious changes takes place both upon the Membranes & upon the humours, the membranes of the shell, upon the appearance of the Chorion branches of vessels are disposed over all, & are spread thro' the white, w.ch is gradually consumed & the young which was at first a bag containing an oily kind of matter gradually forms &c. an air bag is added to keep up the Chick from being tossed about the shell, so y.t it comes at last to fill a great part of the shell, it has been tho.t y.t y.e air was supplied afterwards from the atmosphere or y.e y.e same air dilated itself, but I find y.t it is not merely rarified, & tho you rub the broad end w.th a greasy substance, you will not prevent the enlargement, neither can you by a condensing Instrum.t draw y.e air from it without bursting the Egg, so y.t air is

is secreted from the Vessels dispersed upon the membranes, as in the feathers of Birds, or from Vegetables under water. After the Chick has come to its full size, by an instinct of Nature it disengages its self, it first breaks a hole into the air bag, so that we can hear sound before the Shell gives way, & soon finding a want of fresh air it breaks the Shell arround in the most regular manner, the mother generally lending her assistance. After y. hatching the Yolk is taken in by y. small Intestines, the organs of the animal not having acquired strength for the food, which it takes naturally.

Lecture 120th

I shall explain the manner of making Objects for y. Microscope, without question the most simple is the best, where we secure y. object on a bit of glass, or any transparent Substance

or we slide in a Tube, w^ch^ contines a liquor, we
then hold the Microscope towards a clear light,
there are few objects that require y^e^ direct
light of the Sun, the clear sky is better, or the
light of a Candle answers tollerably well,
& we are enabled to take a near view of an ob
ject, to examine the surface of y^e^ opaque ob
ject we may apply a common magnifying
Glass, throwing a greater light upon y^e^ object
by means of a Concave Mirror, for this kind
of Microscope we are indebted to y^e^ Ingenuity
of the late Dr Lieberkuhn, who is also the
Inventor of another kind, w^ch^ shows objects to
a N^o^ of people at once, so gives a very inter
taining, tho less accurate view than the
former, we exclude the light from y^e^ Cham
ber, & fix the Machine in the window board,
the light passes directly thro the Tube, and
shutting in the object, the picture is thrown
behind the Microscope, upon a sheet of
paper, w^ch^ we may oil to make it more
transparent, we may have Glasses of
Paris

Paris cast upon the marble or a mirror. The
Globules of the blood appear in that way like
Musket bullets, & we see them moving with
rapidity, & when we cannot carried by apparatus
to the Sun, we have a Mirror wch shows by light
of the Sun upon the Tube, the Sun alone having
light enough for Experiments in this manner.

The next Class of Animals is the
Amphibia. I exclude the nantes
Pinnati from it reserving them to their own peace
with Fish, so two Orders only remain, the
Reptiles Predati & Serpents. The first Order
Comprehend 3 Genera Viz. the Tortois,
the Frog & Lizard, for the Draco of Linn.
is only a Lizard with wings, wch regard
to the 2d order of Serpents we may speak of
it as not admitting of further subdivision,
one genl Structure taking place thro' all.

Now of chief Circumstances wch we may
attend to are these, the organs of Digestion agree
wth of former Class, being longer or shorter
according to the food of the Animal, but

your

pursuing the Chyle into y^e^ blood, we find it dispersed in a very different way, & in proportion to the difference the respiration of animals varies.

Let us begin w^th^ y^e^ Tortois, & w^th^ some of the larger Lizards & Serpents. We find an appearance of 2 hearts, & we find as in the Seal large receptacles of Blood in the Vena Cava, both above & beneath the heart, & examining the heart more accurately, we find 2 distended Auricles, so that Lin: is mistaken in supposing that they have only one, the Ventricles appear to have the same shape, but the Aorta as well as the Pulmonary artery comes out from the right Ventricle, so there must be a passage thro y^e^ Septum Medium, & the same thing seams to take place in the larger Lizards, & in many of the Serpents the blood then Circulates in this manner, one part goes to the Lungs, & another to the rest of the Body, drove by the force of both Ventricles concurring at the same time, so a portion of the Mass only passes thro the Lungs, &

the

the surface of these is less extended, & the blood is returned to the left auricle, from y^e. lo^g. left Ventricle, from the left to the right, & from that into both auricles, w^ch. receive their blood at y^e. same time, so this animal is not under the necessity of breathing alternately with the former Class, a part of the blood only going by the Lungs, & receptacles being contrived for containing the blood before it reaches the Cavity of the heart. In the other Genera the structure is less complex still, as in y^e. small Lizards, or common Salamander Aquatica & in the Frog where we have but a single Auricle & Ventricle w^ch. supply the air Vessels & the rest of the body, & as about 1/3 only passes by y^e. Lungs, they can live longer than the former Class without breathing, so a Serpent can be hanged or drowned in half an hour, but it requires 5 or 6 hours to drown a Frog, & there is no reason to suppose w^th. Haller y^t. y^e. blood moves with such rapidity in the Air Vesicle of the Frog, for it is pushed on w^th. more force tho

thro it & thro the rest of the body. The Lungs of the Frog does not collapse, nay if you press out the air from this Vesicle, he can again dilate it, w^ch he does by means of a particular structure of the Nostrils, w^ch he can shut with pleasure, and pressing with the Muscles of the Jaw he squeezes the Air Mechanically into the Lungs.—

Attending now to the Organs of the Senses, we find that these are exercised by the same general means, only the origin of the Nerves is gradually more extended, so we are told that a Tortoise can live & move its body Six Months after the head is cut off.—

With reg^d to the Generation here, they are all Oviparous, producing Eggs like Birds, only some of them hatch the Eggs within the body, while others deposite them. In the Male the Testes are placed high up in the body, & open up in the common Cloaca, & in the female at the side of the Intestinal Canal, numerous Convolutions of the ulterine Tube, of w^ch there is one on each side, the beginning of the Tube is at y^e Membr^n which

wch represents the Diaphragm, that is at the beginning of the Ovarium to occasion the ripening of the ova, but they ripen to such a degree without such an operation, & the manner of reaching that of the Tube is inconceivable, but it has been noticed 100 years ago by Swammerdam, the ova burst from the Ovarium into the open cavity of the Abdomen & float loose among the Intestines, till by some power wch we cannot explain they are thrust into the beginning of the Tube, & in the youngest Female before there is any room to suppose any application of the male Influence, we observe black coloured substances in the Ovarium resembling the Tadpole, which is the young Frog.

We next consider the Fish, wch apply the pure water naturally to their Lungs, & wch move by the assistance of Fins in it, by this Description we exclude the Whale kind, wch from the structure of their heart & Lungs, are properly included in the Mammalia The shape of the Fish is excellently calculated

for

for dividing the water & if we were to study this shape we might improve in the shape of shipeng, the skin of the animal is protected by a quantity of slime, wch is conveyed by a black line or Duct, & there is a system of lymphatic vessels wch appear joined, but really have no valves. The fish is pushed forward chiefly by his tail, but he has a No of other fins on y back & belly to help him straight in Course, then we observe at the lower part the gut of Anus: and without doubt they in some measure serve that purpose, while the others rather intended for turning his body, if a fish turns to the left side he lets down the right pectoral fin & heaps up the left, whence the body turns round by the resistance of the water.

We next observe the inward Texture, most Fishes in order to render their body Specifically light, & allow them to ascend, have a bag filled with air near the back bone, & in many there are Communications betwen y bag & y Stomach, as in the Herring where the Stomach is Conical and

and ends in a small Tube w^ch goes into y^e Vesica aerea, yet the air does not come from y^e aliment canal, but is rather discharged from y^e bag in it, & I shou you a red substance, w^ch I suspect to be a Gland that separates the air, for we constantly find such a substance, while in many there is no outlet to be seen from the bag.

Examining their inward Structure, instead of a Pancreas, we obs: a N^o of Intest: Cæci, but there is no room for any particular mark, in the Circulating System we observe a very remarkable difference, there is one Auricle, & one Ventricle, from w^ch a single artery comes out, & this is entirely lost upon the Gills of y^e Ani- I shou the Skate as a great instance, the veins w^ch correspond w^th this artery meeting together form one Vessel, w^ch does not return to the Heart, but from the Aorta or Canal from which all the rest of the Body is supplied, & w^ch runs down the trunk, & is accompanied by y^e Vena Cava, w^ch returns y^e blood to y^e heart.

Now as the Cantles peninale of Animals

have

have the whole blood exposed in the Lungs
like the other fish, they cannot have the Pulmo
Arbitlaries, but must breath in a regular and
alternate manner, & some of them can breath
air instead of water, as the Crap. Next we
observe y^t the whole mass of Blood has y^r water
applied to it, & as fish can't live in water depri-
ved of its air, I formerly inferred that besides
the carrying something hurtful, w^ch might be
done equally well by the water, we receive some
what useful from the air, in y^e heart & Lungs,
the red globules are internately mixed with the
others, but in the rest of the body the red
globules are excluded, so we have a clear view
of a descending series of arteries, so we would
conclude w^th Boerh: agt Haller, that y^e arteries
divide into descending series.

Next the Vena Cava is large in proportion
as in y^e former Class, so the Colourless veins return
to the heart by the Cava, or there is little reason
to suppose that these form the Vesicular Lymphat^s

With respect to the Senses, there is nearly
the

the same organiz^n as in the former Class, fishes smell very acutely, the Eyes agree, only Palpebrae are wanting, the Crystalline Lens is more nearly Spherical, & of a harder Consistance, for the rays require a little turn in passing from water into the Eye, than from air, so they need a dens or substance, give them the necessary turn, & from the Spherical figure the Eye is fitted for taking in a larger field, which may compensate for their wanting of neck, we find a very odd appearance about the Ear, the Cavity that is behind the Brain, in w^c there is a strong substance, much used by Ladies in making their sheet works, being as hard as Stone, it swims in a liquor without having any connection with the neighbouring parts, & it receives Layers in proportion to the Eye of the Animal.

Now that is the only substance in Fish w^c we can compare to the Ear, there is no passage in it, & we have only the analogy of Situation, for we do not find Nerves for receiving

receiving the Impression, the Brain itself is in proportion to the size of the animal, a great deal smaller than in the first Class, & yet they feel as acutely & exercise their muscles more violently than we do, & this confirms us in the opinion, that the Brain exercises powers beyond those of sense & motion, & in all fishes there is a quantity of water betwixt the Brain & membrane that lines the Skull, whether any tremor of the air is conveyed by means of this to the Brain I mentioned is uncertain, here we evidently observe y^e dissipation of y^e Optic Nerves.

In the Generation of Fishes y^e only difference is y^t a vast No. of them thro a vast No. of minute Eggs into water, whilst others have y^e Organs more resembling those of Birds, so in y^e Shark kind we find a bed of yolks in the back of the animal, & an Abdominal Duct leading down which adds the white in y^e Uterus a horny Substance like the shell of a Bird is added, so if we suppose a division of y^e flesh into 2 orders, we may refer y^e Naides Spinnati to the

the 2d. Order from this difference in y^e Generating.

In the remaining Classes of animals I find very little to observe, I need not detain you with that indless divisions & subdivisions w^ch respect to Insects & Worms, from their external form, it is enough for our purpose that you understand the general structure in these parts of y^e animal, w^ch are essential to life, or to the propagation of it. now taking the Lobster & Crab as an Example of an Insect, we find the circulation carried on by the force of the heart, & we observe the same thing of several of the Worms, as the common black Snail or Spout fish, & in some of them branches only supply the Lungs, so in y^e Lobster & Crab we find the Pulmo Arbitarius and y^e y^e motion of it depends upon y^e small feet w^ch they have. Next in many we find a Brain, w^ch is directed by Sinc^s & Glulwich it is a general Rule in nature, y^t. wherever you can show eyes & substance like to the head, you can trace thro the optic nerve a Brain, or a substance which when hurt produces convulsions, & a violent

pain

pain to the animal. still lower we find the heart
itself, in purfal in some worms, as the sea egg, I
could never discover an organ pushing on the
Blood. Descending still lower, as the Polypus
the animal can be divided into a No. of parts,
so if probably there is no general heard, or canal
sowing to push on the Mass. —

Next w.t Reg.d to y.e N. S. in some we find a
brain situated, as in us, but in several worms,
as in the spaut fish there is small knots and
threads going from them to the muscles, &
touching these they produce Convulsions, so
they are organs sowing the office of y.e brain,
or the whole origin of the nerves is not collected
in one place, till at length, as in worms,
there is no particular spot from w.ch the Nerves
influence can be supposed to come, so when
you break a sea Egg upon a Table, every part
of it moves, nay perhaps if we were allowed
to reason upon it, we cannot see why the
brain is found in Man, but that the organ
is tender, & the animal is not covered with any

Skin

substance, so that it needs a defence, but where where the animal is covered w. a shell. the Extremeties of the arteries can actuate the nerves. or perhaps produce them. —

As yet w. reg. to Monsters. some believe that a Monster is produced by two perfect animals, being squared mechanically within the Mother, while others conceive y. no Monster can be produced in that manner, but both circumstances take place. for 2 animals originally perfect may adhere & make one within the Body of the Mother, but in such cases the Changes are slight. & when there is but one hand to 2 bodies, or one heart, or one stomach, & the aorta is divided equally to both, where there are 2 hearts forming one Aorta &c. certainly no situation of parts could produce such appearances, but these parts must have been originally so formed. I would call such Monsters,

just

just as I would call the mule a monster where from the first production of the animal the appearance is nearly the same as we find it afterwards.

I have thus given you such an account of the Comparative Anatomy to throw further light upon the human Structure, to have gone further would have been needless.

Lecture 12th

I have reserved to attempts to explain some material Circumstances of Animal Economy, which requires assistance from Comparative Anatomy, or from other Sciences, these however are so few in No. that I shall take leave to give them an appearance of Connection, but I shall endeavour to do so, & hint in a general way a Method in which our Physiology might be perhaps studied with advantage, & in which we might proceed like Mathematicians, from more simple ~~principles~~ to the more com

complex facts, for the most approved Systems of Boerh: & Haller are liable to objections. Boerh: traces merely the course of the Chyle, by wh he is led to describe the Texture of your fluids in a regular manner, but he is far from doing so wt respect to the Solids of the Body, he was far from being sufficiently aware of the powers of the living principle, and attempted to reduce every thing to Mechanical principles, often concealing difficulties, while he seems to explain them. The System of Haller is still more faulty in point of Method, wh brings under one head every circumstance wt respect to an Organ, just as a Writer in the Materia Medica instead of laying down his plan founded on the Vertues of the several substances, attempted to give an Explanation of them as they occur in the Alphabetical order, so look into Haller, & you will find by. he supposes that you are acquainted wt. Secretion, Sensation & many of the complex Operations, even

before

before the heart, the Vessels, or Structure of the Brain has been explained.

Now after distinguishing y^e^ Animal from the Vegetable kingdom, & y^e^ Human Oeconomy be our main object we ought to begin w^th^ understanding the Texture of it, in the strictly Anatomical part of the Subject we examin in the fluids & solids of the Body.

We after that ought to indeavour to observe the different actions of w^ch^ the Machine is capable, & here we observe merely the powers of the heart without at present considering the cause of alternate motion, & so of the other Organs. When the actions are understood we proceed a step farther, to determine the immediate effects w^ch^ y^e^ actions are supposed to have, & lastly we observe the connection between the Living principle, the mind & body of the Animal, & investigate the various ways in w^ch^ the body in consequence of it may be influenced, so far we would observe these Powers on w^ch^ the Energies of Animals in gen^l^ depends

depends, we would perceive their Vital powers, but next from the continuance of these powers, a supply is necessary to repair the waste, & lastly we would examine the propagation of Animals, the powers by w^h they are enabled to continue their Species.

Keeping this Method in view I shall proceed to the Operations if need to be explained.

I have formerly explained that the Animal Kingdom was readily distinguished from y^e Vegetable by the Volition w^h y^e Animal exercises, we can now add a more evident Anatomical Character, that all Animals receive the supply within y^e Body, where it undergoes in an organ similar to our Stomach, certain changes before it is fitted to be received. We observe in y^e Lithophyta & Zoophyta of Lin^s w^h ought to be concluded under one Order of Lithophyta, for as to such producing plants, & those flowering and producing Animals there is no good ground for it. We find the regular figures to be either Constructed by the Animal after it has acquired a

a certain degree of perfection, or it may be found that animals encrust vegitable matter so y. the same kinds of animals produce figures of different appearances. The Kingdom being separated, & our views directed to the human Oconomy, we would next enter upon y. anatomy of it, & we have already examined fully the Structure of every organ, & likewise the principles of the circulating mass.—

We are also acquainted w. all y. powers of Motion w. y. Animal Exercises, & have likewise considered the effects of that Motion, & it only remains on this subject to mention y. Ideas w. Authors present us with respect to the power of the heart.—

The power of the heart is evidently very great, and assists in pushing on 40 or 50 lbs. of Blood, as we learn from dryeing the parts of animals, or from finding, as in the Expt. of Dr. Haller, that you can draw off from a wound in a large Vessel of an animal 1/10 part of its weight, so a man weighing

200 lbs. would only die when he had lost 20 lb. of Blood. & after Death the Muscles very nearly retain the Colour, nay when Haller fixed a Tube in the Carotid artery of the animal, the blood rose to a considerable height, so we must suppose it more rarified than was our own, & then the motion of the blood is with considerable velocity even in the Veins of the animal. Next the heart being supposed to be the only mover, it lifts as it were, the parts of the Body's weight, & even over comes the pressure of the Atmosphere, as our vessels proceed we find them divided into numerous branches & these are not placed in streight lines, but a great part of the force of the heart is lost by the different turns of the arteries, then at least they divide into Branches wch not only escape the naked Eye, but are difficultly seen to. the Microscope, tho containing red particles, & if we may credit Calculations made, the Diamiter of the least of the red arteries does not exceed 1/3000 part of an Inch. so the swiftness with which the Blood

Blood moves, is continually increasing, & entering into Circulation we are astonished w.t y.e N.s of the 3.d 4.th & 5.th the surface over w.ch y.e blood moves, (as continually increasing) in every stroke of the heart, you have seen that the Ventricle of the heart is able to contain at least ½ an ℥ of Blood to suppose ⅓ij thrown out at every stroke, it passes from the heart into a vessel very nearly an Inch Diameter, the Aorta, we shall suppose a transverse section of it to be equal to a square Inch. now 60 such strokes and upwards are given in the minute, or 120 ounces of Blood passes thro the heart in a minute, & measuring the Blood 2 Cubic Inches are near by equal to one ounce. & therefore at every stroke of the heart 4 Inches in length of the Aorta may be completely filled now we can calculate the real velocity of the Blood in y.e Aorta with ease. The heart emits in a single minute supposing 60 strokes is 240 Inches in length, but the whole of the motion is communicated in the very instant that the heart

heart is in action, wch is only the ⅓ of time), so the velocity is 3 times greater than is commonly calculated. Following such principles now so far the Nos of Capillary vessels is very much out of sight. So let us find a way of making such calculation.

The Diameter of the Capillary artery upon the lowest principle is equal to the 3000 part of an Inch, that is, we can dispose on the side of this Column of Blood 3000 different arteries, & there would be the same Nos on the opposite side, so the number of such arteries as would fill a Sq. Inch would be 3000. × 3000 = 9000,000. If the extreme branches of our arteries put all together were of the same size wch a Sq. Inch there would be the Capillary arteries in our body 9 Million. But next the Sq. area of the arteries continually encreasing, that the branches of any artery together makes a much larger bulk than the Trunk, thus we must know how much

much the area of the ultimate branches exceeds y.
area of the Trunk, to complete the Calculation we
do this by observing the rapidity of the Circulation
in a transparent part in one of these ultimate
branches, & viewing these wth a Microscope.
Dr Hales alledges that a red particle in a single
stroke of the heart moves about the 100 part of
an Inch, so to carry it thro' 1 Inches 100 Strokes
will be necessary, so the Multiplying we have
got by 100, we determine the No. of Capillary
arteries to be 3, 600, 000, 000, & I do not doubt
but their No. exceeds this, because there are many
of a descending series. now the very mention of
the No., & wt carries along wth it an Idea of the
surface to wch y blood is applied, wch is the
most striking proof of the very quick power
of the heart, & the other organs promoting the
Circulation, & it prepares us for judging of
Calculations we have been instituted on that
Subject. We find various Methods proposed
by Authors for determining the force of the
heart, but that none of these have approached
the

the truth appears from this that they disagree very much, some reducing the force to a few ounces or pounds, while according to others it amounts to many thousand pounds. but that wch is most genl. and to wch no proper objection have been made is that of Dr. Hales, his method by many has been thought conclusive, & at first sight it appears very much to be so, he fixes a Tube glass in the carotid artery of an animal, observing the height to wch the blood ascends in the Tube, now that being found, says Hales action & reaction being perfectly equal, we have only to determine that weight of the column upon the surface of the heart for the heart pushes up the blood with the same force, wch wch that blood tends to fall down upon the heart, & his principle no doubt is sound & just, hence he neatly cuts open the Ventricles of the heart & observes how many square feet, or square Inches there are in it.

But let us make a small number in order to explain the Subject more easily, Sup

suppose that in spreading out y. Ventricles of the animals heart I find it to contain 4 square Inches. I have now only to observe the height, call it 100 Inches, it was to 8 feet or more in a Horse, I see how many Cubic Inches would rest upon the surface, it is evident there would be 400 Cubic Inches, I then calculate the weight of these, & I find it equal to 200 ℔, so Hales concludes that y. heart acts w. y. Pr. equal to ℔ 200, the reason of determining the surface of y. whole heart, & then making the Calculation of the whole height, as that in any Cistern w. a spout from the roof of the house, if we fill the Hogshead w. water & then open y. spout, the pressure on the bottom & on the sides the same, as if we continued a vessel of y. same size to the roof of the house, & we do likewise admit that merely reasoning from the weight of the blood upon the heart his Conclusion is just.

But we cannot apply it to the action of y. heart, for w. the pressure w. y. heart makes there is a stroke given, the powers of which we

we certainly cannot Calculate; so if I want to put a nail in a Board w.th a Hammer, I do not apply the head of the hammer & press on y.e nail, but I give a stroke, in like manner the action of the heart resembles a stroke, the force of w.ch is vastly greater than mere pressure, & I take it for granted that the power of it greatly exceeds that Hales has concluded.

Next we would compare the force of y.e heart & of your arteries together, but we dare find it difficult to do so, & rather than to show that when the heart is in motion, y.e blood is thrown out from an artery of middle size w.th greater force than when the Trunk of the artery is cut, but we are not to conclude from this that the heart is more powerful in promoting motion than all the arteries taken together, for the arteries to their ultimate branches are active, & we can not say to what degree that activity pushes on the blood, so in a fish the whole mass of the Blood by the power of the heart is thrown into

into the Gills, but coming thro' the Gills, it passes on thro' other Vessels, wch do the office of arteries like our Vena Portarum, nay in the System of the Abdominal Viscera of Fish, the Veins of the 2d. Circle uniting from the Arteries of the 1st. Now as the stroke of the heart is lost in the Extremities of the first System, we must ascribe much to the activity of the Vessels. We add the effects of Muscles on promoting the motion of the blood in the arteries as well as the Veins.—

Understanding now the manner of the motion of the general mass, & the force of the organs by which that is performed, we would next proceed to consider all the uses to which it may serve, but these I have formerly explained, & every material circumstance connected wth it, one excepted, wch I enter upon now with reluctance, from the extreme difficulty of drawing any certain conclusion, how far the motion & the heat of Animals may depend upon it, we are in reality so little accustomed with

with the general Cause producing heat, that we must find ourselves greatly at a loss to determine the particular Causes operating in the animal body. Thus we are very certain the heat on the surface of the Earth is much owing to the influence of the Sun, & yet it is very doubtful, whether there be more heat in the body of the Sun than on the Earth. In like manner we attempt to discover Causes of heat; we are apt to say that the friction of bodies on one another fluids as well as Solids, or these running together produce heat, & yet I find that very author of entertain these Ideas proposing Experts so far like in appearance tous, &. we would imagine the consequence of all ought to be the same, & yet in making one kind there is a violent motion & heat produced, but in making others, as in dissolving Neutral Salts in water, the acids wt the Alkalies in general, we see similar motions, & expect similar effects, but are disappointed, & find extreme degrees of Cold produced. What account then are we to give

of the heat of Animals: Various opinions are proposed, wch are plausible at first sight, and yet examined further they are loaded with difficulties and Objections.

1st Putrefaction is proposed by some as the principal cause, we find by Vegetables substances heaped together contract heat, & being afterwards put into a Retort & Distilled they approach nearer to the texture of animals than they are before. and Animal bodies run into Putrefaction after Death, nay I have no doubt by and Substances very much putrified do likewise like a haystack produce heat, so on cutting into the heart of a Whale, wch had been a fortnight under water, I found a heat wch I ascribed to a degree of putrefaction, but in smaller Subjects exposed to putrefaction we do not observe that, besides, the Atmosphere of other bodies arround carry off the heat perhaps as fast as it is generated, or nearly so, but we are surely not to apply this for explaining the heat of our bodies in a healthy state, for if that were the Case, & that the heat is check-

ed

checked by the Regulable substances we are contin-
-ually throwing in, we should observe it in very
different degrees at different times, according to the
having taken or wanted food, for a length of time,
or according to the kind of food, whereas we are
sensible that when we have taken the most
antiseptic substances, as a large quantity of Wine,
Spirits &c. the heat of our body is increased, or we
find it if after an animal has fasted very long,
there is no great increase of heat, then don't
we find that we can increase the heat of the body
at pleasure by running a few yards, & that on
stopping it cools, whereas if this was owing
to a putrefaction of the humours it would
increase. In like manner heat is generated
in particular places where the whole body is
not affected, whereas it would be equal in all
if it was owing to the putrefaction of the circu-
-lating humours, so that attending to putri-
-faction disposes to it, & assists in a certain
degree - I am far from considering that as a
principal Cause. Next some Laxative course

to

to supposed properties of Nervous fluids, or one
to another, an Electrid matter, a Phlogiston &c.
where we have very little ground for Experm. to pro
ceed on, & particularly it is supposed by some lungs
this heat is produced, now I think that perfectly
widout that heat at least does not depend altogether
on Respiration, & that it can be produced indepen-
dent of it, for tho' an incubated Egg needs the addition
of the heat of the Mother, there is more heat in
the Chick than in the humrs of an Egg exposed
to the Mother, & in wr there is no Corruption,
I apprehend that this will be found to be y Case
that the Solutus to a certain degree can generate
heat, we find the heat to be generated very sud
denly in any part of the Body, if a person blushes
he finds an increase of heat in his face, & this
is not a false sensation, for an other person
applying the hand would be sensible of the
same effect, so I apprehend you'll find y heat
is connected w. the motion of parts, the com
mon way of speaking has been that it is owing
to attrition, but in accounting for it from the

the

the various pulses have not been held in view. Authors have contented themselves to y^e effect of one globule or part of the blood rolling up on another, or against the Vessels thro' w^ch it passes. But the motion of the body has a farther effect. there is a general activity of parts in w^ch every fibre, & every particle of the fibre plays up on one another, & the heat is found the greatest where, whilst the general force of the circulation is maintained by the particular arteries, act to. their full vigour, it is produced instantly, & supplied from a continuance of time by y^e activity of parts in a manner I do not pretend to understand, but every circumstance seems to show this, the general motion thro' the heart & large arteries is one cause, for if these languishes the heat languishes, or we diminish the heat in an inflamed part by opening y^e rapidity of the blood thro' the arteries, or when an artery tied up, tho' the nerves excite their power fully, the members become cool, tho' there is as much motion as is sufficient to preserve life

life, whereas if we produce a distension of the vessels, as by a topical Stimulus, whether of the Sceptic or anticeptic nature, we find the heat is generated, so upon the whole I apprehend we should find the heat depends chiefly upon the activity of the vessels, whether the Nerves operate in a primary or secondary way we are at a loss to determine, but we are not to say that they operate in a primary because a Palsied limb is cold, for that cannot happen without a loss of activity on which the heat depends. From this View we may understand in some measure how the heat of the body remains pretty equally the same in Summer & Winter, or why it is not increased enormously in a Lake warm, both where the body is not loosing much, because the heat of the Sun or both has an effect like to that of the weakness of the Nerves. From the operations described formerly, & adding the Influence which heat has upon the body, we perceive the necessity of Secretion, by which we do not mean merely the separation of the component parts

5

of the Blood, but with this further Changes, we these by Glandular structure undergo, as I endeavoured to prove formerly in opposition to Haller. If his Idea were just, the detaining any of the secreted liquors in the mass, or forcing them back after they are separated would have the same effect. Thus we know y. if Semen in a Bull alters the appearance of the body, and produces a Color of the flesh. Now if that depended upon certain principles in the general mass we retain these by castration, so instead of Color being diminished, it would be increased, & all the other ill would be more manifest. In like manner the Bile when retained by Scirrhus Liver does not produce the common Symptoms of Jaundice, as the Yellowness, these depends upon the bile having been first secreted, & then returned to the mass.

Lect. 1762

Lecture 12th.

Hitherto we have considered the Human Body as a Hydraulic System; we would now proceed to trace the connection between y^e Body & the living parts, & to understand the ways in which a living principle is rendered sensible of Impression made, or Injury done to it, & the means by which, in consequence of such Impressions, it performs its Motions, but you recollect that formerly in the course I endeavoured to explain both fully, that little more remains than a supplement to one of the organs of our Senses, the Eye, I formerly took for granted that a picture of the Object we look at is formed on the bottom of the Eye, so I would now consider the manner in w^ch such an Effect can be produced, for unless very circumstanced w^th regard to the Eye be understood, cases will occur where you can neither judge of the cause nor the cure in a proper manner,

You

You know that any luminous body, as a candle
scatters its light on all sides, particles of light
are known and from it, wch run in streight lines,
for if any object be interposed, as a crooked
tube, we can't see thro it, as it proceeds it is
gradually growing fainter, because it scatters,
& that in proportion to the squares of the
distance. Next the light falls on a body wch
it does not penetrate, as a plate of silver, or
a mirror, it rebounds from it, or is reflected
in the same direction in wch it falls, just as
when one strikes a ball on the ground, it rises
at the same angle on the opposite side, but
if the substance allows the light to pass thro
it, & if it falls streight upon ye substance,
it keeps its direct course, but if it is slanted,
it is found by Experience it makes an angle,
where it enters inwards towards ye perpendi-
cular, if it passes into a deeper substance, &
the turn is in a few exceptions proportioned
to the density of the substance, now you all
know this without making much reflection
about

about it, for if a streight Cane is dipped into water, it appears crooked, if you fix a shilling at a bit of wax to the bottom of a vessel, then walk backwards till the bottom of the vessel intercepts your view, on pouring on water it will seem to rise near the surface, or if you look to a Fish in water he is always deeper than he seems to be, so if a person is to try to shoot a fish under water, he must aime lower than it, now as the Ray passing from air to water, is turned towards the perpendicular, so when it passes from water into air, it is turned away from the perpendicular. Now on that Circumstance depends the power of the Eye in collecting the Rays of Light, & we can readily trace them thro the Crystalline Lens, the middle line falls perpendicular, but the rest falls in a slanting direction, & the only difference here is to find the perpendicular, to do this we draw a line from the Centre of the Sphere, & wherever that strikes it must be exactly in the middle, on this way

(J)

may we find the focus of all the Rays, & we may form the figure of any object with all humours of the Eye collected upon the Retina at y^e bottom of it, & we observe y^e figure inverted, cutting a part of the Sclerotick Coat behind.

Now let us next draw in the Eye it self the rays of light, & observe the use of every part, suppose them coming from a dart, or any thing from two ends different, one ray falling perpendicular ~~to all~~ passes directly thro' the Eye, & comes to the back part of the other rays undergo turns. if any ray falls obliquely it is perhaps cast off altogether, but suppose that it penetrates at the very entrance into the Eye, the principal turn is made by the aqueous humour, yet we speak, & justly, of the Crystal-line Lens as being the principal organ that makes the turn, because it had occupied the anterior part of the Eye, the turn would still have been greater, now to find what turn the ray I am tracing takes towards the perpendicular, I have only to get the Centre of the Cornea

Cornea, & draw a line representing a perpendicular,
now as the Lens are more dense than y^e aqueous
humour plunging to the bottom of water, & has
more of the Oily Sulph^s. matter, so will give the
Rays a greater turn in proportion to its density,
then it is a 2^d. turn made as the Rays enters y^e
Lens towards the Centre. Next the Ray passes
into the Vitreous humour rarer than y^e Lens,
but I would observe first the more diff^t. these
are in density, the greater the turn must be.
The Vitreous humour is done rather from
necessity, than from choice of Nature. For
merely to give the Rays their proper direction,
are substituted, would have made y^e turn greater,
but a tough substance was necessary to support
the Lens. the density however is less in such
a proportion y^t. the turn is considerable, for
the Ray runs away from y^e perpendicular,
turning still more inwards, now considering
it in this manner we explain a (circumstance),
w^ch. tho described, is not accounted for, that the
posterior part of the Lens makes a greater
Curve

curve than the anterior, for in proportion to the curvature the turn increases, so all the Rays are brought to one point, & how we have the head of the Dart accurately represented suppose, & we might trace the Rays from the point in like manner, or the Dart is situated opposite to the middle of the Chrystalline Lens, on the axis side of the Optic Nerve, & you observe that the Objt is inverted, how comes it then that we see the Dart in its true place?, or comes it that every Objt is not inverted? The Solution is simple, & most authors have perplexed themselves to no manner of purpose, the Explanation has been given by De Cartes, by y^e^ comparison of a blind man searching his way with a Couple of Sticks, if you take a Couple of Staves & cross them, & touch one Substance with the one, & another with the other, tho that w^ch^ is undermost affects the uppermost hand you know that it is undermost from the Direction. In like manner I know by an Instinct of Nature without Reasoning that no Ray

Ray can fall from an object in the bottom, unless the object is above it, so we judge intirely from the situation, from the Direction in w.ch the Rays have come from the Eye.

Next you know Images grow less in proportion to the greater distance they are removed from us, but when viewing it thro' magnifying Glasses, they remain equally distant, why then do we see a near object better than a distant one? Porterfield &c accounts for it from the substance floating in the air intercepting many of the Rays, but I have no doubt that the effect would be the same in Vacuo, the reason is that the impression is multiplied if the distance be double, the same picture from the same distance is painted on 4 times the space, & in every part of that space the impression is as strong as where the area of the Picture is diminished, so 4 times the surface of Nerves is impressed & multiplying is the same as increasing the sensibility of the Nerves. The

We next consider the way in wch the Eye adapts itself to objects at different distances, some have deny'd we see an object perfectly in any one place, because they cannot see Instruments by wch any Change can be made. Others suppose the Lens to alter its shape by means of a Muscular power in its Layers & Fibres, others suppose that it is lifted forwards by the Ciliary processes, others account for it from the Iris altering the convexity of the Cornea &c but these operate very little in Vision, & I suspect it would be found that there is not only an alteration, but that those who have had Crystalline Lens Couched, see nearly as well as others, that as we accomodate the Eye chiefly to the distance by the action of the Iris, allowing more or fewer rays to enter the Eye, that there is a real change of the Eye is clearly proved by Porterfield, tho' he has mistaken the manner of the Change, he makes 2 slits on a bit of Card, & the partition between them not more than the breadth of the Pupil, now if you

turn

shut the left Eye & look thro the hole, you see one candle only in one situation, but in every other you see two candles. Now here seems to be one place of perfect Vision, & in all others the Vision is imperfect, but now if while the head is so situated you open the left Eye, you have a single appearance, or there is a real change of Conformation made on the first, or place two pins in a straight line, & looking at the nearest, you see the parts distinctly, but the parts of the other become obscure, the fixing your Eye on the farthest & the parts of the nearest become indistinct, i. e. the Eye has altered its Conformation. Porterfield alledges that it can adapt its self accurately within 2 Inches, but I find the limits of distinct vision so much farther, that I can go to the distance of 10 or 12 Feet, but as to the means of alteration every one of these can't have the supposed effect, the Muscles act unequally, the Sclerotic Coat in some animals is Cartilaginous, so we

we cannot suppose the smallest change to be made in the Eye, but all animals possess the motions of the Curtain, w^ch is known as is done in a more extensive way than is imagined, it not only adapts the Eye to the general degree of light, but when we view minute objects near to the Eye, the motion of the Iris can be observed, the effect of this you will judge of very readily from trying to open the apperture in viewing a near object, thus if we bring a small printed book near to the Eye, the letters are intermixed, but if we clap between the book & the Eye a Card with a small hole in it, I read the letters distinctly, it serves the purpose of a Microscope by cutting off the superfluous rays which fall obliquely & disturb the clearness of the Picture, so this power of the Eye chiefly depends upon the motion of the Iris. Now after explaining what is proper to one Eye, you understand the reason of long & short sight clearly, people are long sighted, others again are short sighted, & we can discover this by looking

looking at the Eye, there is a great roundness in the Cornea, so that the focus falls before the Retina, but wn it & the Crystalline Lens, & this must bring the object near to the Eye, by wch they throw the focus farther behind the Lens, now if a person possessing the ordinary degree of sight, was all at once short sighted, objects would appear much larger to him, as in viewing an object wth a Microscope wch only enlarges our Conceptions wth respect to it, we know that we can see an object at a moderate distance of 6, 7, or 8 Inches distinctly, if then I see any object very distinctly, I conceive it is at y^e^ distance, we conceive that it must be of a certain size, so we suppose it magnified wth y^e^ Microscope, if again my Eye is too flat, the focus falls behind the Retina, so old only people apply to themselves by with a Convex Lens to bring the Rays near together, whereas short sighted people use a Concave Lens, that y^e^ Eye may collect them in the proper place. Now why have we two Eyes since we can collect

called the pulvre, and distinguish objects
w. tollerable accuracy. 1st accidents are
guarded against by the 3rd optic
nerves 2dly the Impression is multiplied, we
see better w. two than w. one, reading Haller
who has the misfortune to be short sighted,
so brings objects so near that he can see w. one
Eye only, he would persuade us that we only
use one at a time but we use both, & reap the
advantage of seeing much better, & judging w.
more accuracy, besides a further use is alledged
by Porterfield that we judge w. the one of the
distance, & judge of the magnitude supposing
the distance equal, but by directing the 2 Eyes
to the same point we take the angle which
is formed, & from an Instinct of nature we
judge of its distance, so you may try the last
by shutting one Eye, & try to pour out a dish of
Tea, or introduce a crooked stick into a ring,
you will do it difficultly with one, & this is
not from the want of habit, for the person
with one Eye never does it w. accuracy,
The

tho' better than we do at the first trial. If the
Eyes happen not to fit exactly, if the one has a
Conformation different from the other, we use
but one, or the person from this circumstance
gets into the habit of squinting, tho' this may de-
pend upon a real dislocation of the parts of
the Eye, from the Chrystalline Lens being
placed too much sideways, but generally there
is not the smallest room for alledging this,
for on shutting one Eye the person can look
streight with the other, he only turns one
aside when both are open, as confounding
the Impression. Now if that is attended to, it
leads to an attempt of Cure, use the strong
Eye, till by habit the weak Eye acquires equal
powers, & in this way we may succeed in cur-
ing the complaint. The last Question here is
how it comes, that with 2 Eyes Objects appear
single. I imagine that a great deal has been
wrote upon this Subject to very little purpose,
Nature from the first Moment of seeing
teaches us to judge in that way, we are con-
stantly

conscious that the Eyes are directed to the same point by an Instinct of Nature, we turn them to the same object, as our two Eyes serve as one: Besides we see the same appearance the same Number of points presented in the same Situation, & it is impossible to conceive two objects absolutely similar, & we have the rays from the place where the stroke is given, by habit indeed a circumstance is added, that Impressions are made in the same parts of both Eyes, so that tho' we are looking at one object, if one Eye is convulsed by the Muscles affected we seem to see two objects, the impression coming on a place that has not been used to it, just as when we cross the fingers upon a Pea & roll it, we judge there are two, because it comes to touch parts, to which naturally it would not be contiguous—

Sect. 123.

Lecture 12th.

The Various Operations we have considered wearing down the Solids of Animals, & continually altering & dispersing the fluid parts, renders a fresh supply necessary for the continuation of this life & this you know is supplied from the Vegetable, or from the animal Kingdom, we by nature seem intended for both, this appears whither we confine our Views to the Structure of the Body, the general Custom of Nations, or Analogy to similar animals, you know already the mechanical Operations the food undergoes, & the general appearances of Liquors when mixed with it, it only remains that I attempt to explain the manner in which the food we take in is dissolved & at the same time rendered safe for being received or assimulated to the Constitution. You will be entertained in considering this Subject to find nearly the same proposed near 2000 years

years ago with regard to Digestion that are given by the present Writers, upon the whole, the following Circumstances seem chiefly to concur. 1st Our Food undergoes considerable Changes by the acts of Cooking, and we join to that a certain proportion of Drink, which as it passes thro the mouth, besides of Mandu cation it undergoes, there is a considerable mixture of Saliva, & of Mucus with it we then the Stomach, it is incorporated w. y. Drink, & it is there not only subjected to the action of the muscular Coat of the Stomach, but to the agitation of the arteries running upon its Coats, & to the alternate motions in respir.

At the same time it is exposed to the heat of our body, w. joined to moisture & motion, we must suppose to have an effect to a certain extent, but we are by no means to conceive y. the Circumstances I have mentioned are the most essential; for without almost any of them, Digestion takes place in one or other of the kinds of Animals, the chief cause is y. Humours

humours of the stomach acting as menstrua. Thus Dr Young has shewn in his Thesis delaite that the humours of the stomachs of animals before they have tasted of food. i. e. in the fœtus state posess the power of curdling milk, he observed this in these animals that never tasted Milk as their natural ailment, as the birds, so this gives a suspicion that this humour is naturally different from the merely watery parts of the blood. Neat Anatomists of the last Century have observed in fish the parts of less or fish, even the bones melting down in the space of a few hours that the part included in the Stomach was dissolved. whilst the part lodged in the Oesophagus remained entire. I have mentioned the Experiment I made on a Dog, of giving him hard bones, wch were dissolved. In the Ruminant animals again we find the inner coats of the several stomachs differing from one another, & we find the food in different states within these.

Next we have seen the appearance of the

Stomach

Stomach is different in different kinds of animals, varies according to the nature of the food, & in fact it is found to possess very different powers.

So Raumeur inclosed Grain & flesh in Cylinders of Iron perforated with holes, & gave them to the Carnivorous & Granivorous Birds, the flesh in the Carnivorous soon melted, & the Grain in the Granivorous, but reversing the Experiment the Change was much less perceptible; so the Liquors of the Stomach evidently act as powerful Menstrua, & to this Mr. John Hunter has added considerable weight, by having observed that in the Stomach of Analogators the Coats of the Stomach themselves were dissolved, from this he justly ensures ye. this power of the Liquors remains after Death, but he has carried the matter too far, in supposing that it never acts but upon the dead body, I have observed the destruction of the Coats of the Stomach in a few persons, but I consider this rather as the effect of the Disease, not conceiving that quantity of the Menstruum

would

would have had so great an effect after Death,
in one case there was great reason to suppose
that the change had begun during life.

A Lady about 70 years of age had considle
oppressions & pain about y. Stomach, & died sud
denly, y. body was opened after Death, & y. Coats of
y. Stomach were found destroyed, & suspected by this
might happen before Death, & parts of living
animals, as Eels have been found dissolving in
the Stomach of Fish, while other parts
remained alive in the Throat. so this may
be a source of Disorder, at least y. circumst.
ance well merit attention, to the causes
mentioned I have reason to add the effect
of the Gas or spirit which for want of a name
sufficiently expressive we call Fermentation,
on this subject the Experiments of Dr. W. Brid
are the most satisfying. Sir John Pringle
has supposed an Acetous fermentation
a Vinegar to be formed, but the first
effect of the fermentation to produce a
sweet substance in opposition to sour,

and

and this forms new Combinations in y. food & assimilates it to the constitution, and the changes on our food are much more sudden than in the imperfect assimilations of Sir J. Pringle.

In the rest of the alimentary canal y. food continues to undergo similar operations, as appears from the diff. length of the alimentary canal in the Herbivorous & Carnivorous. for if the processes of Digestion were compleated in the Stomach, the different lengths would not be observable, & in the Herbivorous kind the Intestines receive the addition of some liquors that seem to resemble those of the Stomach, it receives a further supply of Saliva from the Pancreas, & a quantity of Intestinal liquor from the Extremities of the Mesenteric arteries like that in the Stomach, & farther it receives the Bile, but the use of that is so little understood that I would avoid saying any thing about it, the Canal by means of it is solicited to Contraction, but further, in all animals the

Duodenum

Duodenum is larger than the continuation of it, it descends & returns again, & the food is purposly stopped, & such a remorse was by no means necessary for stimulating the Canal only.

After the food has undergone the proper Dissolution, it is taken into the Constitution by the Lacteal Vessels & mixed with the mass of blood, & all the further changes made upon it has been mentioned as far as can be done with tollerable certainty.

After the Digestion of the food we are led to consider 2 circumstances wch serve equally wch for the growth of Animals. I mean first the somewhat which from the Lapsum mentioned on Fish, we seem to receive from the surrounding Element, the other circumstance is the state of Sleep, wch is intended for recruiting the animal as much as Digestion itself, but in this I shall only make a few observations, sensible of the difficulty when we attempt to go far. What I mean to allege is that the proximate Cause of Sleep is very generally

generally misunderstood. Physiologists seek for it in mechanical circumstances, whereas these merely introduce a disposition to that state. If the Animal receives a quantity of food, tho' of the mildest nature, it soon grows drowsy, & from Instinct disposes itself to sleep, & the Inclination to sleep continues for a considerable length of time, like as we might suppose if the crude humours received have been subdued by the vessels of the Animal.

Next you know if Bodily Labour brings on sleep, & if attention of mind has the same effect, & the contrary of these dispose to wakefulness, but these dispose to these states only, & will not produce them, if proximate Cause of sleep is some what we never shall comprehend, it is an Instinct of nature by w^h we relax the Mind as well as body, from the full exertion of their powers, we relax every power w^h is not essential to life, we can therefore go no farther than to shew if circumstances if give if disposition, wh is

is unnecessary to mention more than y. most Common.

When we now review the operations of the animal & recollect y. y. heart & y. brain act upon each other in a circle that we are not able to distinguish cause from the effect, & now we observe y. the animal not only possesses y. power of preparing the real waste of its substances, but of relieving the solids of the body from their false contractions & allowing them to recover their Tone. Reasoning in this manner we would conclude an animal to be made for immediately, & we learn the contrary more from Experience than from Reasoning, but supposing that not only from the general appearance this conclusion were just but that animals were so constructed, y. y. waste & the repair be exactly made to ballance each other, still we would perceive y. necessity of animals possessing the power of generating their like, or continuing their species, External accidents would render this necessary, but to take things as we find them, that the different Genera & species of animals are limited

to

to a certain duration, & by w^ch the power of the
Creator is more manifested, than in y^e former
supposition of all lasting for ever, because y^e
work is measured out in a newer manner,
that to a certain period of life y^e repair gradually exceeds it, then from the middle period
downwards the contrary is observed, but
leaving things as we find them, the Creation
is more diversified, appears more beautiful,
& one Generation is amused w^th rearing the
succeeding one, & the race of animals is not
maimed w^th the unavoidable accidents of long
life. In Generation some animals produce
their young by shoots, as Vegetables do, where
the heart & brain are wanting, in some others
an individual possesses the powers of generating its like, but for the most part 2 Animals
Male & Female assist, & that even where the
animals are Hermaphrodite, & in the case of
most of Worms, in the former parts of this
Discourse I have so particularly explained all
the facts, & the drawn Conclusions in respect to
Generation

Generation, that very little now remains, except that we consider how far the Rudiment can be supposed to proceed from the Male, or from the Female, & as connected w^th Generation that we consider the cause of Menstrual Flux in Women.

The Rudiment of a Fœtus is so exceedingly minute, that we would judge as much by reason & Conjecture, as from direct Experiment. Many have supposed the Rudim^t comes entirely from the Male, the Female furnishes merely a lodging to it, while others suppose the Rudiment to preexist in the Female, & to be brought to life by the Male Influence.

Now the first opinion was in a great measure founded on the appearance of the Male semen set before the Microscope, we observe in it Corpuscles shaped very like to Tadpoles, with a round somewhat oval shaped head, & a tail nearly in proportion to it. now they possess motion, they move w^th rapidity, & the motions they perform are accompanied w^th vibrations & bending of the Tail, the Corpuscules made to

the

together, they turn sideways, may the small Corpuscules with out a doubt alter its Course after running a certain way forwards it turns again, so that any one seeing them, has y. same belief of their being living animals, that he has of seeing fish amove in a River, & I would observe that the history given by Buffon wt. much seeming accuracy, is from beginning to end a mere Romance, I deny that there is any such Revolutions or Changes y. he describes, but in the first instance they appear as in the last, & when in an hour or two y. motion ceases, the Corpuscules are seen, they remain in the Liquor, after a longer period they disappear, but no other come on in their place. Now tho' I believe they are living animals, yet I do not imagine that each of these is a Fetus in miniature, & the motion is too violent & rapid, the figure is different, & suppose y. we could not perceive any thing like these in the body of a female, I would not conclude that the Redundance was from y. male, these

these may exist in the male Semen, as a fit
medium for them, just as we find Eels in Vine-
gar, with out supposing y.e y.e accidity of the
Vinegar depends upon their Eels, but Buffon if
his Experiments may be credited has seen the
same appearance in the Ovarium of a female,
so the very foundation of this opinion is set
aside & we must judge from other circumstances,
& upon the whole in one particular Genus of
animals, in the Frog, I observe that there are
black substances in the Ovarium, w.ch perfectly
correspond in their Colour & general shape w.th
y.e Tad pole, & this before Conception is very
young Frogs, & from this the Idea of Haller
that the Rudiment exists in the female,
in this Genus receives a full proof, at y.e same
time if we are to speak in general, & more
especially w.th reg.d to the first Class, I would
doubt of the opinion very greatly, for it is
plain that if from accident, Exper.t or Disease,
there be any interruption in the passage
leading to the Uterus, or to the Ovarium, there
is

is no Conception.

Next we never obsowe if from any imagination of the female, however strongly operated upon in time of sleep, a Conception arises. Next there is a resemblance to the male as well as to the female in the foetus, we might conceive the Ovaduimus to come from the male alone, & yet to resemble the female from the Lodgement & length of time it is commuted, but if it comes from the female alone, there is no means left for explaining this circumstance. we obsowe the likeness in all kinds of animals, in some more remarkable than in others, or if different species of the same Genus engender together, we find if if foetus is a perfect mixture of the two, & I have no doubt that the same thing would happen without any of the External senses of the animal intervening. A Mule that is blind produce on an ass a Mule as certainly as one that sees, there is therefore reason to

to believe, that at the very instance of Conception there is a real mixture of Male & Female Influence, in the manner we shall never be able to comprehend, but it is as requisite to the production of a Fœtus, as the mixture of an alkali w^th an acid is to produce a Neutral.

The other Circumstance remaining now to be mentioned relates to the cause of y^e Menstrual flux of Women, you know y^e Generation only happens during the Continuation of it, before we enter upon the Cause, let us recollect a few Circumstances demonstrated of y^e Structure, some of the otherwise most acute Ancients as Morgagni, have given wrong Ideas of that Structure of the Uterus, w^ch in some places are very Convoluted, & w^ch at last ends by opening mouths within the Cavity, while the Coiral branches from y^e Artery communicate to corresponding veins, & these Communications are so small that we do not perceive them w^th the naked Eye, we likewise find branches of veins open

ing

opening into the Cavity of the uterus, or we observe a structure a good deal resembling that of the Corpora Cavernosa of the Penis, or of the Clitoris, the Circulation may go on between the Artery & the Veins, without any effusion into the Cells of the Penis, but when it goes on there may be an effusion into the Cells, & a passage of blood from the Cells into the Veins. Now this is all that we observe in the Uterus, for there is no Sinuses such as Morgagni & others have spoke, they imagined that an artery goes into a larger Cavity, & that a vein comes out from the Cavity, & from the Sinuses a Canal leading to the Cavity of the Uterus, but we can trace the arteries Cylindrical the whole way, as also the Veins.

Some have supposed the Menstrual blood to be Venous, & if a violent exertion be made, the blood may be pushed back from the trunk of the Vein into a branch & the order for Circulation for a moment

inverted

inverted, but for ordinary we must conceive that Menstrual blood to flow from y^e^ Extremities of the Arteries, & as it has no Receptacles, that it is pure, & of the same kind w^t^. y^e^ circulat^g^ mass

Next let us attend to the Phenomena, it begins generally in this Island about the 15^th^. year, it is preceded by a gen^l^. uneasiness, the body at the same time in a state of growth not yet come to its Acme, the appearance is altered, the face is changed, they complain of uneasiness in the Breast & pain in the head, & have complaints about the Stomach, still later they feel pains shooting down the Limbs, w^t^. an uneasy gripping pain in y^e^ Intestines & a heat about the Regio Pubis, then the flux succeeds at first more irregular in its appearance, but soon coming to be remarkably regular, & generally happening in every Lunar period, about 13 times in the year, in many it is preceded ever afterwards w^t^. the Symptoms described, but in the greater number these are so very slight, y^t^. y^e^ flux happens before the

the person is aware of it, or she is only aware of it a few hours before, in time of the flux there are evident marks of Languor & Debility, the Eye appears hollow, the face paler, there is a red Colour round the Eye, this appearance of Languor ceases nearly w. the flux, & when the flux is over there are no symptoms of weakness left. Women that are full & take little Exercise discharge a much greater quantity of blood than others do, & sometimes the periods are more frequent, if a Woman gives such suck the flux generally ceases, tho there are some Instances of Women who menstruate & give suck at the same time, & that without any bad Consequences. Now what Cause are we to assign for the Discharge? The frequency of y^e^ periods corresponds w^th^. y^e^ revolutions of the moon gave rise to the opinion among y^e^ ancients y^t^ y^e^ flux depends intirely upon y^e^ influence of y^e^ Body, I own it is not easy for one to reject this & would allege that many more women menstruate at the new & full moon, than at any

any other period, at the same time it appears at every period of the moon, & that we find that it is not Menstrual tho' many or happening 2ce a month, or once in three weeks, there is still some more specific, I avoid Causes that are but little attended to, as evidently wanting a proper Examination, as the Venereal appetite, & I shall chiefly state the opinions, which have chiefly divided Physicians.—

The most ancient & the most general is that of Men. flux is owing to a fullness of the Blood vessels of the Body, or to a Plethora of the whole System, whilst others imagine that the Cause depends upon a local or Uterine Plethora, that the Uterus by its Structure accumulates the Blood, without the rest of the body being primarily & principally affected. Now before saying any thing on any opinion I would observe that the arguments on either side have been stated wrong. It is admitted by Authors as a fact that Men as well as Women are subject to Plethora,

but

but I can't believe that Nature orders any thing in vain, & I can see no ground for supposing that men are disposed to too great a fullness of Blood, they have that which is useful to them & no more.

Next they argue that as our Vessels were a mere System of Hydraulic Tubes, without attending to the power of motion & its Consequence of this, Rupturing to the most natural argument. I shall begin with stating the objection to the General Plethora, they tell us that instead of finding Symptoms of general Plethore at the time of the Flux, there are evident Symptoms of great Debility, now if signs of great Debility never precede the real beginning of the flux, they only attend it, perhaps the Languor, the Oppression are full before the whole Blood is evidently discharged, but I apprehend not before it has made its way into the Cavity of the Uterus, which possesses an exquisite Sensibility capable of disordering the whole Oeconomy, & here 2 circumstances are to be heeded in view. 1st the effect which Blood in

in an unusual manner tricklingdown its inner
surface, & distending it, the other is the effect of a
fullness any where in the Vascular System is apt
to bring on, so Robust persons have nearly the
same langued look whilst blood is flowing
from a Vein, tho' the quantity is small, & they
themselves not under the smallest apprehension.
Next they tell us the quantity discharged
or rumour
is not so considerable to produce, the bad
effects of Plethora, not exceeding 4, 5 or 6 ℥.
but we every Day in feverish disorders ob-
tain great relief from letting that quantity
of Blood. we are not merely to say that we
take more drink, the effect of the drink & of
the Blood may be opposite, the one may heat
& irritate, the other may serve to cool y body.
They observe next that y same discharge do's
take place in very female Animal, but this
equally makes against the supposition of
the Uterine Plethora, without adding that
Animals at the proper time of conceiving
there is in reality a discharge besides
a

a real difference wᵗ I remarked between the Connection of the Fœtus to the Quadruped & to the human Body. Next they tell us that if there was a genᵈ Plethora, we would be able to prevent the flux, & very bad Consequences attending the want of it, by letting a few Ounces of blood, now this Argument will only apply to the Hydraulic Machine, where yᵉ repair is in proportion to the waste. Supposing that the Vessels of the Viscera have yielded to yᵉ general push & fullness are irritated, & thrown into a more violent action, & letting a few Ounces of Blood from the Arm is not sufficient to remove the action any more than yᵉ cutting an irritated Nerve is sufficient to remove all the Symptoms wᶜʰ the irritated Nerve has produced, & tho' about the middle period you let a quantity of blood, the Mᵉ flux comes on at the usual time, for unless our bodies sucked in nourishment in proportion to the drain, it would never recover yᵉ loss of substance, & if the period of the flux be near

near. Women in general are averse to the letting of blood, because the general Experience has proved that it is hurtful. Next we are told that in persons where there are no Plethora, as well as Plethoric people, Menstruate very readily. Now first supposing this to be a fact, should we not make allowance for that general relaxation of parts which then takes place, the Uterus has a larger outlet than another organ, & being in a relaxed state the blood readily forces its way thro' it, still more so in the Plethoric where there is a degree of Putrescency in the humours, & the whole System is irritated, & we must make an allowance for the force of habit, which is very powerful, & in fact the Menstrual flux very often happens in persons that are much reduced & weakened by Disease. In like manner they tell us that after a Woman has been Delivered, & that the flux soon returns, but the time is more distant than is alledged, never almost like a month, six weeks or two months, & the surprise is rather that it is too

late

late, because at least during the Pregnancy has constantly prepared more than is sufficient for itself. They next observe that if the Menses flux be obstructed, the uneasiness goes off in a few days, an' attempt returns in a month after, there is a struggle & uneasiness for some days, we too easily: now if it depends upon a Genl Plethora the oppression should increase in a gradual proportion, because the blood would be more accumulated, but the very disorder of the body in the struggle has in some measure the effect of the flux, & shows that such struggles may proceed from Plethora, & so again and again return without any discharge, if a person is in the habit of drawing blood at regular times, he feels an uneasiness which goes off again, but again returns. Next they alledge that this Plethora does not answer its purpose because if but ℥V. or ℥VI. of blood is accumulated, that in 9 months make ℥XLV. whereas the Foetus weighs 3 times as much. now the objection will vanish when we consider

consider the Consequence, supposing that the full quantity, & in due proportion had been discharged each month. there would have been a danger in y.e first months when the Calus was not able to consume it, an absorption must have taken place, whereas by striking a Medium the Calus as it increases the power of the Mother in collecting what is necessary. Now so far of the objections against a general Plethora.

Next I shall mention a few objections against the supposition y.t y.e Plethora is merely Uterine, as y.e rest of the Body is not affected, & I begin with observing that that very Language admits of a much better explanation on the former Supposition, at least those who adopt the latter have taken no manner of pains to upon the objection why the rest of the Body is not oppressed. Next how comes it y.t y.e flux happens at y.e very time y.e whole Body is increasing in a remarkable manner, is there not then a general push upon every Organ, & the flux connected w.th y.e efforts upon the

the rest of the System, or how do we explain the previous Symptoms, for if the Uterine plethora be natural & useful, why does that produce such a general disorder, why does the Head & the most distant parts suffer before it appears? or how does it happen that Nurses do not menstruate, or how is the Uterine Flush ora transferred sometimes to the Lungs, to the Nose &c. but I would bring an argumentum Crucis, a very plain anatomical fact, that there are no receptacles in the Uterus for lodging the quantity discharged. If we find not in the Uterus of Women who have died during ye flux any distension of the Vessels, nor any place for lodging the blood, the difference of bulk is not sensible, so cannot exceed ℥j, & the other ℥ VI must come from the general System, & they come in (advantage to Women, so more blood must have been contained in the Vessels than was useful: upon the whole therefore it appears that as Women are intended to nourish for a No of Months, the Fœtus as well as their own

body

body. their Constitution is fitted by Nature in a manner we do not understand for preparing more blood & nutritial matter than is necessary for themselves, hence a necessity of this arises. that a portion of this shall from time to time be discharged, & that an outlet be given, or we find y^e larger vessels open into the Cavity of the Uterus than in any other Cavity serving as an outlet to y^e body.

Hence the fœtus of the human body is nourished in a manner proper to it. vessels are produced, w^ch we may compare to the vessels arising answering from a fresh wound. y^e stretch out & mix w^th y^e parts of the or Membranes connected w^th y^e Fœtus, hence on y^e aut^r likewise we find open mouths of Vessels, & as Nature is ever simple in completing her purpose, the discharge is made, and y^e fœtus nourished by the same vessels, & unless the fœtus was applied to the vessels, these by giving way would prevent y^e accumulat^n of nourishment, & preparing it in sufficient quantity in the last months of pregnancy, the

the full quantity of Blood necessary is not discharged, but a medium is struck, the Fœtus being as little able to consume ℥VI. in the first month as in the last, it is able to live upon 6, & since the Vessels of the Fœtus are entangled by the vessels of the mother, by the drain the quantity is increased, for the Vessels correspond with the Placenta, wherever any organ fixes comes to be the largest, just as in the Breast by the sucking of the child & Lactiferous Duct comes to be enlarged, so very fœcum stance in this view seems to be consistent, & the only point doubtful is whether the Uterus is somewhat better calculated by its Structure for accumulating than the other organs, this may be the case, but there is no receptacle to contain the quantity of 5 or 6 ounces.

I have now finished as I proposed in the beginning of this Course, & thro' the whole I've made it a Rule, because I consider it as a Duty to explain myself on every Subject without the smallest regard to the mere opinion of

or authority of Authors, I hope you'll think I endeavoured to do so without prejudice or partiality & the freedom I use this it is incumbent upon me to use with great names, has not been misunderstood. I hope you are far from thinking that I have meant to point out the authors as more erroneous than others, this is so far from being the case, that I would wish to recommend them chiefly to your perusal, as eminence they have acquired justly merits, but I thot you would be more in danger of being misled by them than by others. I wished to convince you the necessity of thinking freely for yourselves on every subject, unless you do so you will never detect the fallacy in reasoning, nor clearly perceive the force of Truth.

Now as we are about to part it is quite unnecessary to say any thing as a spur to your future Industry, you are surely by this time sufficiently convinced that the profession you have undertaken, considered as a general Science, is as extensive as it is important in its

its Consequences, & y. if application to Practice will be often found as diff.t to the Phys.n as critical & interesting to the Patient, & as after all y. pains we can take to acquire improvement, we are often perplexed with doubt & hurt & disappointment, w.e must be embittered to a fuling mind, if there is the smallest reason for supposing that if we had been more attentive, & suized the proper opportunity, we w.d have been better inabled to discharge the trust of your friends, but any observations of that kind Know are unnecessary. Your attention all along w.e I must chiefly attributed to your own desire of Improvement is a sufficient proof of it.

I wish you success in your several Undertakings, & if I can contribute to that you well freely let me know. I will always consider such an opportunity as an additional favour.